View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Digital Repository @ Iowa State University

IOWA STATE UNIVERSITY
Digital Repository

Graduate Theses and Dissertations

Iowa State University Capstones, Theses and Dissertations

2018

Online communities of practice as a strategy for staff involvement in SWITCH

Rebecca Harken
Iowa State University

Follow this and additional works at: https://lib.dr.iastate.edu/etd

 Part of the Kinesiology Commons

Recommended Citation

Harken, Rebecca, "Online communities of practice as a strategy for staff involvement in SWITCH" (2018). *Graduate Theses and Dissertations*. 16590.
https://lib.dr.iastate.edu/etd/16590

This Thesis is brought to you for free and open access by the Iowa State University Capstones, Theses and Dissertations at Iowa State University Digital Repository. It has been accepted for inclusion in Graduate Theses and Dissertations by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.

Online communities of practice as a strategy for staff involvement in SWITCH

by

Rebecca Harken

A thesis submitted to the graduate faculty

In partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Major: Diet and Exercise

Program of Study Committee:
Spyridoula Vazou, Major Professor
Greg Welk
Lorraine Lanningham-Foster

The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this thesis. The Graduate College will ensure this thesis is globally accessible and will not permit alterations after a degree is conferred.

Iowa State University
Ames, Iowa
2018

Copyright © Rebecca Harken, 2018. All rights reserved.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Comprehensive School Physical Activity Programs (CSPAP) target physical activity behaviors through the recommended “whole-of-school” approach which recommends staff from all areas of school should be involved in health promotion. The component of Staff Involvement is highly effective at improving student health behaviors; however, descriptive research in this area is limited. One program that focuses on supporting school staff to lead school wellness programing is SWITCH. It is recommended that school staff should be given opportunities for professional development that are ongoing and collaborative, and online communities of practice (CoP) have been shown to support staff in this way. Therefore, the purpose of this thesis is to examine the usefulness and feasibility of an online CoP as a resource for staff involvement in SWITCH.

An online CoP was developed for school staff, extension members and the SWITCH team to interact and share resources and best practices. The sample consisted of 70 school staff and members of extension, ages 18-69, with the majority being classroom teachers (32.9%) and extension members (21.4%). Feasibility and usefulness of the CoP was measured with number of posts and comments (ning platform throughout the 12 weeks of SWITCH implementation); page views and average time of visits (Google Analytics throughout implementation); perceived value, support, sense of belonging and perceived barriers (Qualtrics survey upon completion of implementation); and self-reported use and importance (checkpoint survey midway and satisfaction survey upon completion of implementation).

Descriptive statistics were used for all variables and correlations for intention, value, belonging, support, and obstacles

Overall visits and average time spent per visit was high with 620 total sessions, 4.67 pages viewed per session, and 3.3 minutes average session duration. Thirty-seven percent of members showed somewhat to high engagement. The CoP was perceived as highly valued and interesting (M=4.32 on a 5-point scale). Members perceived a sense of belonging (M=4.09 on a 5-point scale) and reported intentions to use it in the future (79.1%). Intention to continue to use the CoP was significantly correlated with sense of belonging (especially with trust from the SWITCH team), as well as value and interest in the CoP and perceived support. Perceived obstacles for using the CoP were overall low (M=1.94 on a 4-point scale) with the highest obstacles relating to effort, usability, and self-competence. Significant negative correlations existed between all obstacles and support, belonging, value and interest, similarity, and trust.

This thesis supports the usefulness and feasibility of an online CoP as a tool for SWITCH programming. Members perceived it as valuable and important, and overall obstacles were low. Communities of practice are viewed as a tool to support teachers and provide ongoing collaborative learning opportunities. The present thesis supports the use of online communities of practice in the implementation of SWITCH and their potential as a tool for staff involvement in CSPAP programming.

CHAPTER 1

INTRODUCTION

About half of youth today are not meeting the national physical activity recommendations (CDC, 2012), and about 18.5% of youth are classified as obese (CDC, 2017). Physical inactivity is one of the many factors related to the current childhood obesity epidemic, along with poor nutrition. Childhood obesity comes with a host of consequences regarding physical and psychosocial health. Evidence shows that a child who is obese has a 5.5 times greater likelihood of experiencing impaired health-related quality of life than a non-obese child. This includes physical, emotional, social, and school functioning (Schwimmer, 2003). A common strategy to target this issue has been seen in school wellness programs. Schools are an ideal avenue for promoting health behaviors in children because they have the potential to reach the largest proportion of the youth population (CDC, 2017).

To target health behaviors in the school setting, the Institute of Medicine recommends all schools adopt a whole-of-school approach (IOM, 2013). This approach employs staff from all areas of the school in promoting physical activity. This includes teachers, principals, superintendents, etc. One national effort from SHAPE America towards the whole-of-school approach is the comprehensive school physical activity program (CSPAP). CSPAP targets physical activity through five components: (1) staff involvement, (2) physical activity during school, (3) physical education, (4) physical activity before and after school, and (5) family and community engagement. These components all work together to help students receive the skills, knowledge, and

confidence to reach the recommended 60 minutes of physical activity a day (AAHPERD, 2013).

Teachers may often be hesitant to take on new tasks such as implementing school wellness initiatives. They often report overcrowded schedules and a lack of time to adjust their classroom plans (Egan et al., 2018). School staff, apart from physical education teachers, also likely do not have extensive experience or training on implementing physical activities or promoting wellness at school. However, teachers see value in promoting PA for their students (Huberty, Dinkel, Coleman, Beighle, & Apenteng, 2012; Stylianou et al., 2016). They are willing to modify and adopt new strategies related to physical activity as long as they perceive that they have had sufficient training and support (Sharpe et al., 2011; Weaver et al., 2014; Weaver et al., 2016; Berei, 2015).

A meta-analysis by Russ et al. (2015) reviewed interventions focused on targeting multiple CSPAP components and found that interventions that targeted staff involvement were more effective than interventions that did not include this component. However, these interventions were the least represented. In the context of school wellness, there is limited descriptive information regarding staff training (Beets, Beighle, Erwin, & Huberty, 2009; Lander et al., 2017; Russ et al., 2015). Interventions that involve this component are often lacking in specifics of staff training and offer little insight into implementation. In cases where such data is provided, measures are often subjective with limited objective data. It is recommended that evaluations of staff training should include detailed monitoring and reporting and systematic observations of staff behaviors (Webster et al., 2018).

1.1 SWITCH

One program that focuses on the professional development of school staff by building their capacity to lead school wellness programming is SWITCH (School Wellness Integration Targeting Child Health). SWITCH is designed to empower schools to lead wellness change through a 12-week program by focusing on three factors that have been shown to be related to childhood obesity: physical activity, screen time, and fruit and vegetable consumption. Students are encouraged to switch what they Do, View, and Chew by working toward three goals: (1) switch up to 60 minutes or more of physical activity a day, (2) switch down to 2 hours or less of screen time a day, and (3) switch up to 5 servings or more of fruits and vegetables a day. SWITCH focuses on the recommended whole-of-school approach by targeting the classroom, lunchroom, and PE. These staff are provided with evidence-based modules which provide tools and resources for educating their students about these three components and activities to engage students in learning and to get them moving. Students are encouraged to fill out online trackers in which they set goals and record their behaviors related to physical activity, screen time, and fruit and vegetable consumption (Eisenmann et al., 2008). Each school develops a core team whose responsibility it is to lead school staff in implementing SWITCH and act as liaisons between school staff and the research team. SWITCH has been successful in promoting healthy behaviors in students through creating the SWITCH environment in schools (Gentile et al., 2009).

SWITCH is largely developed around CSPAP and has begun to more closely target the component of staff involvement. The SWITCH team has developed an online CoP one of the strategies to offer ongoing support and professional development for

school staff involved in SWITCH. Communities of practice have been identified as an effective strategy of professional development (Castelli, Centeio, & Nicksic, 2013), and have been utilized frequently in education. However, there is limited research on communities of practice within the area of school health promotion and prevention. Due to the greater success of CSPAP interventions that target school staff, it is critical that SWITCH school staff are sufficiently trained in implementing the program into their schools. Staff activity and behavior from the SWITCH CoP will offer insight into the effectiveness and feasibility of an online CoP to promote staff engagement and implementation of an established CSPAP initiative.

1.2 Purposes

The primary purpose of this thesis is to explore the usefulness and feasibility of the SWITCH CoP by school staff involved in wellness programming. It is hypothesized that the SWITCH online CoP will be perceived as a useful resource for school staff to successfully implement the SWITCH program. Perceived and actual barriers in implementing the SWITCH CoP as well as level of adoption and implementation will be identified. The second purpose of this thesis is to assess the association between student behavior and the level of engagement in the CoP by school.

CHAPTER 2

LITERATURE REVIEW

2.1 School Wellness

Given the high prevalence of childhood obesity and its relation to poor physical activity and nutrition behaviors, prevention strategies targeting these components have been implemented to promote healthy behaviors in children. The school environment has been frequently targeted for its potential to reach large populations of children. Not only do physical activity and nutrition interventions prevent against childhood obesity and its associated health consequences, they also work to improve student learning and academic achievement. Evidence shows that healthier children learn better and that physical activity improves factors such as grades, standardized test scores, attention span, and behavior in the classroom (USDHHS, 2010). School-based interventions often target health education, physical education, recess, and family involvement.

It is recommended that children and adolescents are physically active for at least 60 minutes a day. Activities should be moderate-to-vigorous in intensity and should include both muscle and bone-strengthening activities (USDHHS, 2008). As schools are an ideal environment for promoting physical activity and other health behaviors, Healthy People 2020 recommends that schools “increase the proportion of students who meet these physical activity guidelines, and who participate in daily physical education and other physical activity opportunities such as recess, after-school activities, and active transport” (USDHHS, 2010).

Although there a great need for school-based wellness programs, the positive effects of these interventions on the total daily physical activity of youth are limited (Metcalf, Henley & Wilkin, 2012). Possible explanations for these findings could be due to poor delivery and implementation as well as ineffective intervention strategies. To improve school wellness programming, the Institute of Medicine has recommended that all schools adopt a whole-of-school approach with staff members of all areas of the school promoting healthy behaviors. One such strategy is a comprehensive school physical activity programs (CSPAP). This strategy targets physical activity from multiple avenues both within and outside of the school setting (AAHPERD, 2013).

2.2 Comprehensive School Physical Activity Program (CSPAP)

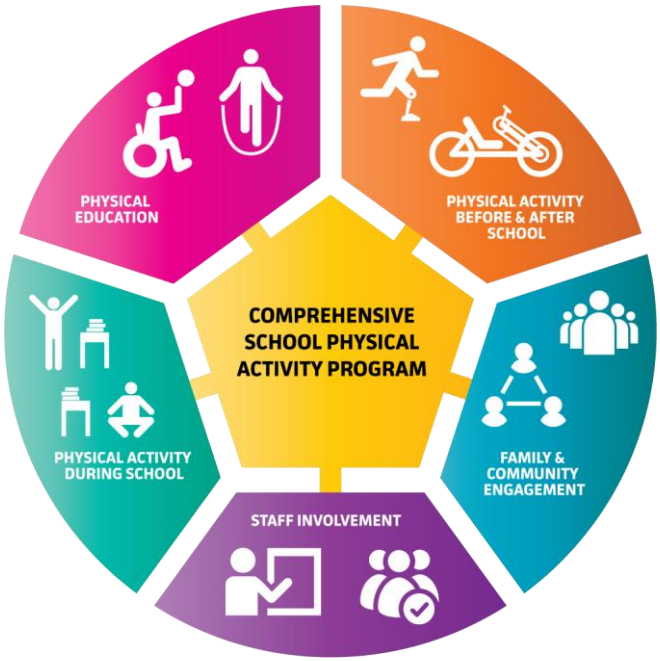

Figure 1: CSPAP Model

The goal of CSPAP is to improve opportunities for physical activity in schools to increase physical activity participation in students. CSPAP targets physical activity through five components: (1) high-quality physical education, (2) physical activity during school, (3) physical activity before and after school, (4) family and community engagement, and (5) staff involvement.

High-quality physical education is paramount in increasing physical activity in the school setting (Rink, Hall & Williams, 2010). It is developed on standards-based instructions with 50% of the class time spent in moderate-to-vigorous physical activity, it follows proper teaching practices, and is appropriate for students' developmental needs (NASPE, 2003). It is recommended that elementary PE should meet for at least 150 minutes each week and should be delivered by qualified PE teachers.

To reach the recommended 60 minutes of daily physical activity, students also need physical activity opportunities throughout the school day. Physical activity during school focuses on implementing recess and including physical activity breaks throughout the school day. These activity breaks improve cognition, concentration and classroom behavior (USDHHS, 2010). The purpose of these components of physical activity during school is to supplement quality physical education, not replace it. Opportunities for physical education throughout the school day will provide students with the opportunity to apply the skills and knowledge they have acquired through physical education and use them to be physically active outside of PE.

Physical activity before and after school has great potential for helping children meet the physical activity recommendations. The opportunities may include intramurals, active transport, activity clubs, youth sports, and after school programs. It is crucial that

schools offer a variety of before and after school programs at various times to provide opportunities for the greatest number of students. It is also recommended that these activities be non-competitive and health-enhancing (NASPE, 2008).

Family and community engagement works to develop a lifetime of physical activity in students by offering programs in the school setting as well as in the community. This often presents itself as recreation leagues, fitness classes, health fairs, and family fun nights. It is recommended that parents are provided information on the benefits of physical activity and their role in promoting physical activity at home (NASPE, 2008). It is extremely beneficial when children can be physically active with their families as research shows that children are more likely to be active when they can be active with their parents (Sallis, Patterson, McKenzie & Nader, 1998).

The final CSPAP component is staff involvement. This can be considered in two ways: (1) promoting personal health and wellness through modeling and encouraging engagement in physical activity, and (2) learning how to lead and provide opportunities for physical activity for students. CSPAP recommends that all school staff should be physically literate not only just for their own personal health and well-being, but also for effectiveness in the workplace. Staff's physical literacy is also beneficial to students as they are observing teachers participating in healthy behaviors. Students may begin to model these healthy behaviors they are observing in their teachers. Schools can also have an impact on students through providing staff with professional development related to physical activity. This provides staff with the abilities to effectively integrate physical activity into the school day. It provides them with tools and strategies for integration and expands their knowledge on the subject at hand to improve their self-

efficacy in educating students on physical activity (Castelli, Centeio, Beighle, Carson, & Nicksic, 2014). This could be particularly important considering that most school staff do not have extensive experience or training during their professional development on how to implement physical activities or promote wellness at school.

As evidenced by a meta-analysis by Russ et al. (2014), the CSPAP component of staff involvement is effective and offers a great deal of insight into program effectiveness, yet is minimally represented. Fourteen CSPAP interventions were analyzed with only two interventions targeting staff involvement, and these revealed a great deal of inconsistencies in training. Most often trainings were provided in a single professional development session and did not provide continual learning opportunities. There was found a lack of collaboration among various areas, which does not comply with the recommendation for a whole-of-school approach. Although staff involvement was lacking in the analyzed interventions, those that included this component had a greater effect size than those that did not. This supports the need for greater focus on staff involvement in CSPAP program implementation.

2.3 Professional Development

Often, there is a pressure to improve students' academic achievement in the classroom. This had led to limited professional development opportunities related to wellness and physical activity (McCaughtry Nulinna, Cothran, Martin, & Faust, 2005). However, the Whole Child Initiative from the Association for Supervision and Curriculum Development views the collaboration between learning and health as fundamental and emphasizes the need to switch the focus from the narrowly defined academic achievement to one that promotes the long-term development and success of children.

"*No matter how well teachers are prepared to teach, no matter what accountability measures are put in place, no matter what governing structures are established for schools, educational progress will be profoundly limited if students are not motivated and are unable to learn [e.g., due to poor health or lack of focus] (Basch, 2011).*

It is critical that teachers are continually learning and developing (NCTAF, 1997). Teachers have the potential to have great influence on students, but the research on professional development and its relation to student achievement and behavior is conflicting. Telese (2012) found that teachers who participated in less professional development had students with higher test scores than teachers who participated in more professional development. In contrast, Kutaka (2017) found a positive effect of participation in professional development on student achievement. Polly (2015) also found that professional development lead to an increase in teacher knowledge which showed a significant relationship with student learning. These conflicting results lead researchers to ask the question of what specifically promotes successful professional development.

Effective professional development can be attributed to five main features: a) knowledge of subject matter, b) collective and collaborative participation, c) continual and long duration, d) coherence with student performance, e) active learning, and f) building of a CoP (Castelli et al., 2013). Not only should school staff be provided with content-specific professional development to expand their physical literacy, but they should be provided with support to assist them in promoting healthy behaviors in their students. Giving teachers the opportunity to interact and collaborate with one another on a regular basis better enables them to connect their personal and professional

knowledge with the knowledge they acquire from their students (Loewenberg & Forzani, 2009). Continual professional development also allows teachers to make connections with one another and to notice the effect of implementation (Supovitz & Turner, 2000). Facilitators are better able to offer teachers the support and resources they need through continual professional development as they are implementing new strategies (Beighle et al., 2013).

It has been shown that professional development should be ongoing and support teacher learning in ways other than single face-to-face sessions (Vescio et al, 2008). A recent strategy in this context has been professional learning communities (PLC). These can be described as groups of people who come together to enhance their professional practice through the sharing of information and participating in shared activities in line with the common goal of the group. In education, professional learning communities are based on the idea of improving student learning by improving teaching practice and are rooted in two assumptions. The first assumption is that knowledge is built on the day-to-day experiences lived by teachers, and these experiences are understood best through reflection with others who share similar experiences. The second assumption is that PLCs, which actively engage members, will increase knowledge and improve student learning (Buysse, Sparkman, & Wesley 2003). Vescio et al. (2008) reviewed 11 studies that evaluated the impact of PLCs on teaching practice and student learning. It was found that both teaching practice and student learning were positively impacted by PLCs. Teacher culture was greatly improved through the PLCs because they worked to promote four key characteristics: (1) collaboration, (2) focus on student learning, (3) teacher authority, and (4) continuous teacher learning.

2.4 Online Communities

With the growing field of technology and social network sites, the use of online tools has been adapted into professional development opportunities. Online communities are an ideal strategy to implement as the social aspect of these communities supports collaborative learning and social support. Social network sites give individuals an environment to build upon relationships that have already been established and to form new relationships. Lampe and Ellison (2012) studied social network sites, specifically through Facebook, and its effects on social relationships. They looked specifically at social capital, which is described as the benefits individuals obtain through relationships. These benefits can come in three forms: *structural, relational*, and *cognitive*. The *structural* dimension refers to the network ties developed that provide access to resources. The *relational* dimension is the personal relationships individuals form through multiple interactions. Lastly, the *cognitive* dimension is the resources that are provided that develop a commonality among a group of people, such as a vision or goal (Nahapiet & Ghoshal, 1998).

Social scientist Robert Putnam describes two types of social capital. The first is *bonding* social capital, which is described as the benefits we derive from close friends. Examples of this may include emotional support or favors. The second type of social capital is *bridging* social capital. This is the benefits we get from individuals in which we are not as strongly associated. This type of social capital is beneficial in providing information, new ideas, and for developing a general sense of community (Putnam, 1995). It was found that the use of Facebook increased social capital, most notably bridging social capital. Facebook, along with other social networking sites, provides a

place to form these relationships and develop a sense of community while sharing ideas and resources with the group collectively. Lampe and Ellison also found through a longitudinal study that the use of Facebook increased social capital long term. Work by Zhao et al. (2012) also found that all three dimensions of social capital were related to sense of belonging which influenced knowledge sharing among members in an online community. These findings show that online tools are valuable in forming and strengthening relationships and in enhancing the exchange of knowledge and ideas among groups of individuals. This supports the idea that online tools are a valuable tool for improving professional development.

2.4.1 Communities of Practice

A specific type of online professional learning communities is the community of practice (CoP). The CoP was proposed by Jean Lave and Etienne Wenger as they were studying learning theory through apprenticeship. The concept of apprenticeship is often thought of as learning through the relationship of the apprentice with his master. However, it was revealed that there is a more complex web of learning through relations between apprentices. The master is perceived as a distant superior, so rather than approaching the master, the apprentice will rely on other apprentices for help and guidance. It is from this finding that the term community of practice was developed. It refers to “the community that acts as a living curriculum for the apprentice” (Wenger-Trayner, 2015). This concept is in line with Bandura’s Social Learning Theory which states that individuals learn in social contexts. The concept of communities of practice was later refined by Wenger to what he defines as “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact

regularly.” Wenger also defines a CoP as a “learning partnership” (Wenger-Trayner, 2014).

Communities of practice are composed of three distinct characteristics: the domain, the community, and the practice. The domain refers to the specific area of interest among a group of individuals. Rather than a group of friends or a network of unrelated individuals, members in a CoP are committed to a specific domain that is shared among all members. The community refers to the relations among members. Individuals will engage in discussion, activities, and information sharing with other members of the community and form relationships through these interactions. A CoP is not simply a group of individuals who share a common interest. Members must interact and learn from and with each other. The practice refers to the ways in which knowledge gained in the community are being implemented outside of the community. Members of a CoP are typically professionals who are enhancing their skills and knowledge in the specific domain of the community. The combination of these three characteristics are what set communities of practice apart from other communities (Wenger-Trayner, 2015).

Communities of practice were originally thought of as spontaneous developments of relationships among individuals. These relationships occurred as individuals recognized similarities amongst each other and formed communities through those similarities. These communities occurred naturally as individuals aimed to develop their art and expertise and learn through the success of others. These communities were organized based on the needs and desires of its members and because of this, they were constantly changing. Communities of practice have developed into designed and

intentional communities for the purpose of improving the outcomes of a business or organization. They can be seen as small communities comprised of only a few members in close proximity or large communities comprised of thousands of members all over the world (Roberts, 2006).

Communities of practice have been adopted in a number of settings. They were first seen in the business sector as a way to engage members in the learning process and to collect the most knowledge and resources within the group. It was recognized that knowledge is essential in business, and it needs to be managed. For similar reasons, communities of practice have also been seen in government organizations. Here we will see communities with members of different areas of expertise come together in a CoP to enhance government policy from all areas. Another sector that has adopted the CoP is education. We see this most in the area of professional development or teacher training. It also serves as a way for educators to interact with each other as teaching is often seen as an isolated profession.

Teachers spend a majority of their day in the classroom rather than interacting with other educators. They develop their teaching style not only through their own education, but also through their personal experiences in the classroom. According to the Social Learning Theory, knowledge is developed through social interaction. Communities of practice provide a place for educators to learn from each other by sharing resources, sharing experiences, giving and receiving support and feedback from other educators, and sharing successes and struggles.

A study by Weaver et al. (2017) evaluated the effect of a CoP and additional approaches to improve movement integration (MI) in the classroom through staff

involvement. Partnership for Active Children in Elementary Schools (PACES) is based on the partnership model proposed by Webster et al. (2015) for implementing CSPAPs. This model is composed of three approaches, the first of which is communities of practice. This gives teachers a place to interact and share ideas for integrating movement in the classroom. The second approach is community-based participatory research. This approach allows researchers and school professionals to collaborate to develop context-sensitive strategies to promote physical activity in the classroom. The third approach is service learning which provides school professionals with additional support from university students as part of their coursework. These three approaches work together to provide support for school professionals to increase students' physical activity.

Results from the study by Weaver et al (2017) revealed a number of key factors in improving staff involvement through communities of practice. Teachers desired to engage in collaborative learning and to feel connected to their peers. They also desired to feel connected to the research team. Throughout the intervention, teachers were sent weekly emails that were specific to each teacher. They reported that these emails gave them the sense that the research team cared about their success and were there for support and assistance when needed. They also reported a desire to adjust MI approaches to fit their unique classroom. One teacher mentioned that after visiting the CoP and observing how other teachers were adjusting MI approached to their specific needs, he felt more comfortable doing the same. Teachers also enjoyed the service learning aspect of the intervention as it provided them with additional resources.

2.4.2 Support in Online Communities

One potential barrier that school staff may experience when promoting health and wellness is low competence in presenting the given information. A study by Moore and Chae (2007) found that beginning teachers require more emotional, personal, and task-based support than veteran teachers. These veteran teachers have developed competence in presenting information throughout their extensive practice. Beginning teachers likely have not developed the same level of competence. This is also the case with teachers who are asked to present information on which they have had no formal training – for example, a classroom teacher being asked to educate on nutrition and physical activity. McMullen et al. (2014) found that when attempting to integrate physical activity into the classroom, teachers felt that they lacked sufficient training. They recognized the importance of physical activity and possessed positive attitudes towards integrating it into the classroom. However, they desired more support and resources to accomplish this (McMullen et al, 2014). The CoP creates the ideal environment to offer that support to these teachers. This support can be seen among members and between members and the research team.

A study by Tang and Lam (2014) investigated an online teaching portfolio to discover how members define an “effective online learning community.” This community was structured around a blog-based portfolio in which teachers would share their work and interact with each other through the blog to provide feedback. They found that the greatest gain of an online community is receiving emotional support. Interviews with members revealed that in instances where a fellow member was upset or struggling with an issue, other members would leave comments asking them not to give up. This

was viewed by members as an essential aspect of the community. They also claimed that reviewing materials presented by fellow teachers encouraged them to reflect more on their own beliefs and identity. Reading comments from other members reminded them to think from another perspective that they would have previously ignored. Teachers claimed to appreciate the blogging aspect of the online community because the interactive features and presence of an audience offered more immediate and interactive feedback.

Tang and Lam (2014) also found that teachers identified the support from mentors to be enriching. Mentors would offer feedback and suggestions based on their expertise which enhanced their understanding and effectiveness of teaching. Through evaluating the PACES intervention, Weaver et al. (2017) found that teachers valued the support from the intervention team. Each week, teachers would receive personalized emails from the intervention team. These emails gave teachers the perception that the intervention team cared about their success and that they would offer support and assistance when needed.

2.4.3 Sense of Belonging in Online Communities

Another key component of online communities is a sense of belonging. This is defined as “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members’ needs will be met through their commitment to be together” (McMillan & Chavis, 1986). A sense of belonging is an important factor for social well-being (Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992) and has been shown to be positively related to outcomes such as job satisfaction (Winter-Collins, 2000) and academic outcomes including

motivation, effort, and absenteeism (Sanchez Colon, & Esparza, 2005). It is a crucial factor in online communities because it has been found to facilitate prolonged participation (Teo et al., 2003), and it also contributes to member loyalty (Lin, 2008). We find that when members of a community have a strong sense of belonging, they care about the group and about the people in the group. This motivates them to participate in discussion and knowledge sharing. They want the community to succeed and they want the members in the community to succeed. It has also been shown that those who feel a strong sense of belonging to a group are more likely to internally adopt the social norms of that group (Teo et al., 2003).

It is theorized that humans are naturally driven toward generating a sense of belonging through social interaction (Baumeister & Leary, 1995). This can also be observed in the Self-Determination Theory by Ryan and Deci (2000) which theorizes that humans possess three basic needs: competence, autonomy, and relatedness. Relatedness can be described as the need to belong and connect with others. It has been found that when employees are in a work environment that fosters these basic needs, there are marked improvements in productivity, job satisfaction, positive attitudes, and psychological well-being (Gagne & Deci, 2005). For this reason, it is recommended that teacher training is focused on social interaction and collaborative learning to satisfy the need for relatedness and belonging.

Sense of belonging is affected greatly by trust and familiarity. When a member experiences trust in a community, they perceive less risk and uncertainty. This is prompted by familiarity among members (Rousseau, Sitkin, Burt & Camerer, 1998) which is generated through interactions. As members of an online community interact

more, they perceive a greater degree of trust (Wu & Chang, 2005). In online communities, individuals will experience familiarity with individuals who are more engaged in the community and those who interact more often. This interaction will generate a greater sense of trust. Through interactions, members will also learn from each other and develop goals and values within the community.

Work by Zhao et al. (2012) investigated what factors facilitate a sense of belonging in an online community and how this affects their participation in regard to their intentions to get and share experience and knowledge. It was found that three factors are positively related to the sense of belonging in online communities: familiarity, perceived similarity, and trust in other members. These three factors also affect intentions to both get and share knowledge. Sense of belonging has also been found to be a mediating factor in online communities. For example, Teo et al. (2003) found that sense of belonging mediated the relationship between perceived usefulness and ease of use on intention to participate in an online community. Lin (2008) also found that sense of belonging mediated the relationship between trust and member satisfaction with member loyalty to an online community. For these reasons, it is recommended that moderators of online communities should emphasize cultivating a sense of belonging when encouraging more active participation (Zhao et al., 2012).

2.4.4 Knowledge Sharing and Receiving

As was evidenced by the work of Zhao et al., (2012), cultivating a sense of belonging affects members' intentions to share and receive knowledge. Knowledge is constantly evolving; new information and new resources are constantly being introduced. With the internet, we have unlimited information, and online communities

are the perfect platform for sharing this information. Communities of practice were originally created in the business sector with the idea of generating the most knowledge among an organization. Members are able to share knowledge and resources with the community and expand the library of resources among the community as a whole. With information coming from multiple members with multiple areas of expertise and personal experiences, members can use this information to generate new ideas and strategies. A study by Yoon and Armour (2015) evaluated the effect of professional learning of physical education teachers through a CoP. They found that engaging in the CoP led to teachers learning and developing new teaching strategies and behaviors, which showed to have an effect on their students.

It is thought that the purpose of knowledge sharing is to combine individual and social knowledge to form team knowledge. As team knowledge expands, individuals are able to collaborate and improve the effectiveness of their common practice. Communities of practice are shown to be an effective mechanism in enhancing the ability to transform this team knowledge into practical knowledge (Chou, 2005). Communities of practice are developed through groups of people who share a common goal. When groups of people are able to identify with each other through these common goals and experience a sense of belonging to the group, they are more likely to engage in the community and contribute to team knowledge.

Cheung et al (2013) determined that the intention to share in a CoP is affected by member satisfaction and knowledge self-efficacy. These two factors are enhanced when members feel that they are helping other members through the information they are sharing. Satisfaction is formed when a behavior produces a result that meets or

exceeds expectations. When individuals perceive that the knowledge they are sharing is beneficial to others in the group, they perceive greater satisfaction with the act of sharing. Knowledge self-efficacy is determined by the belief that one's knowledge can help solve problems, improve efficiency, or positively affect one's organization (Kankanhalli, Tan, & Wei, 2005). Those who have higher knowledge self-efficacy will likely contribute more to team knowledge.

Knowledge sharing in online communities may come in the form of information and resources as well as personal experience. In education, online communities of practice allow staff to share their personal experience in the classroom. Each classroom and each student is unique, which creates a unique experience for each educator. Through communities of practice, teachers are able to learn vicariously through other teachers who may have experienced similar situations to their own. Weaver et al. (2017) found that learning from others and observing strategies from fellow educators led to teachers developing new strategies appropriate for their classroom. Tang and Lam (2014) found that teachers perceived gaining practical knowledge and learning from peers to be two important functions of an online community. Teachers valued shared content from members because it allowed them to reflect and evaluate their own teaching. One member who was less active reported that they did not learn from their own teaching strategies or achieve anything from the online community.

2.4.5 Barriers to Participation

One of the potential downfalls of online communities may be the lack of engagement that progresses over time. This may lead to decreased member satisfaction and participation and potential dropout. Tang et al. (2014) found several

barriers to participation in an online community. It was found that one of the reasons for members losing interest is an increasing number of non-contributors. When members felt that there were others who were contributing to the community, they were also more likely to contribute. Others mentioned that the perceived value of the community affected their engagement. Less active members perceived the community as time-consuming and found it less valuable than active members. More active members are also found to be more satisfied than less active members (Macia & Garcia, 2016). Members also acknowledged fear of other members of the community observing negative feedback of content they have shared. Additionally, members who were not as familiar with each other engaged less. Members who were more familiar with each other were seen to offer more effective and useful feedback.

Along with the work by Tang and Lam, Macia et al., (2016) found that possible explanations for a lack of engagement is fear of being criticized and insecurity in sharing one's own ideas. Similarly, Ardichvili (2002) found that a barrier to knowledge sharing is fear that what they share may not be completely relevant or accurate. Other barriers observed include lack of experience, misunderstanding of expectations, perceived time constraints, and lack of direction in how to use the community. (Williams & Jacobs, 2004; Macia et al., 2016, Ardichvili, 2002). This supports the idea that moderators of online communities should provide adequate instructional information and foster support between community members.

2.4.6 Motivation to Engage

Despite the array of potential barriers, many individuals are excited and motivated to engage in online communities. Research has recently evaluated the

factors that motivate individuals to engage voluntarily in online communities and has found several complex and dynamic factors. Lee-Kelley and Turner (2017) evaluated voluntary participation in a CoP. When members were asked “What is your motivation for being part of the community of practice?”, 88% said “finding best practices,” 85% said “exchanging knowledge,” and 84% said finding out what’s going on.” Communities of practice are often viewed by members as a sort of encyclopedia with content that is readily available when needed. Members view CoPs as a helpful tool to solve problems. They value the ability to post questions and receive feedback to generate a solution. Members also see the benefit of being able to work together and communicate with members from various geographical regions through the CoP (Ardichvili, 2002).

CHAPTER 3

METHODS

3.1 SWITCH

The project was completed as part of a formalized evaluation of the SWITCH implementation model in the Spring of 2018. A total of 25 elementary schools across Iowa were involved in the project (22 new schools and 3 experienced schools). The 22 new schools were randomly assigned into two groups (standard support and enhanced support) to determine the additive benefits of motivational support and facilitation implementation (involving 87 different classroom teachers and other school staff). All schools were encouraged to use the SWITCH CoP, so for the purpose of the present study, differences between the two groups were not considered. Refer to Appendix C for IRB approval.

The SWITCH (School Wellness Integration Targeting Child Health) implementation model is aimed at helping schools to implement a web-based version of the evidenced-based SWITCH program which is aimed at promoting healthy lifestyles in students (increased physical activity, reduced screen time, and increased fruit and vegetable consumption). Students are encouraged to switch what they Do, View, and Chew by working toward three goals: 1) to switch up to 60 minutes or more of physical activity a day, 2) to switch down to 2 hours or less of screen time a day, and 3) to switch up to 5 servings or more of fruits and vegetables a day. The focus of each week alternates between Do, View, and Chew themes, and students are able to track their behaviors related to these themes through an online tracking system.

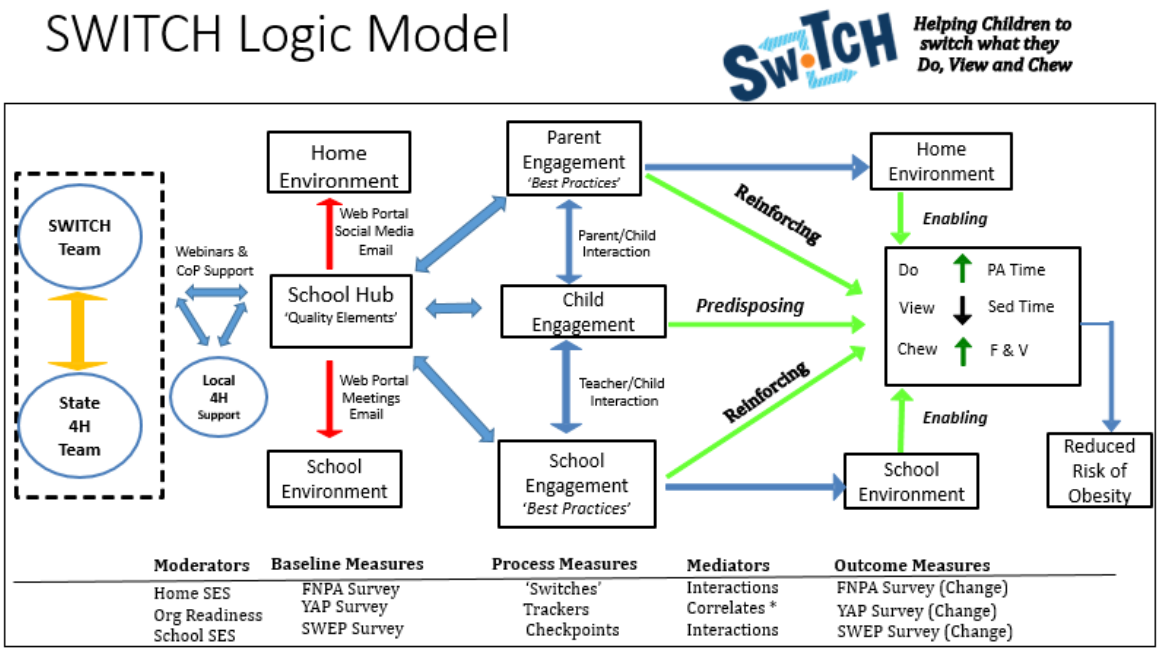

Figure 2: SWITCH Logic Model

SWITCH is designed to support school staff to lead wellness change in their schools through a variety of methods. Staff are encouraged to follow "Quality Elements" which define effective SWITCH implementation. Examples of these elements include facilitating involvement of parents in SWITCH, facilitating that students are tracking their Do, View, and Chew behaviors, and meeting as a team to discuss goals and strategies for SWITCH. These elements assist in optimizing the impact on their school wellness environment and the health of their students. The SWITCH CoP acts as a system of support to connect school staff with the SWITCH team and to encourage implementation of quality elements (Figure 2). Schools are also encouraged to follow "best practices" to facilitate engagement in the classrooms, lunchroom, and PE. These best practices encourage school staff to visit the CoP for weekly updates in each of these areas. Though all school staff were encouraged to become members of the CoP, membership was not mandatory. The goal of these "best practices" is to impact the

school environment and teacher-child interactions to reinforce and enable students to improve their Do, View, Chew behaviors.

3.2 SWITCH CoP Implementation

The CoP was active during the implementation phase of SWITCH, which took place February-April 2018, and involved the integration of the 12-week SWITCH program in the schools. Before implementation, core teams from each school were informed about the CoP and encouraged to become members through in-person and online trainings from the SWITCH team. These trainings were provided to all 25 SWITCH schools with three staff members per school. During the 12 weeks of implementation, the SWITCH team facilitated member engagement in the CoP and offered support by 'liking' and commenting on members' posts, sending emails and encouraging members to share on the CoP.

The SWITCH CoP works as an online platform for members to make friends, send direct messages, as well as 'like' and comment on other members' posts. The purpose of these features was to facilitate community and foster a feeling of support and belonging among members. They were also able to post their own content in the form of text, photos, videos and links to outside sources. These posts allowed members to share ideas and resources that they believed to be beneficial for the community. The SWITCH CoP was administered through Ning, which is a private online platform for creating social networks. This page was owned and monitored by the SWITCH team. Individuals who were asked to join the SWITCH CoP created an account and login with a valid email. This step prevented unauthorized members from interacting with the SWITCH community. Once they become a member, they could edit their account profile

by adding a profile photo, editing their personal information, and by becoming friends with other members. The CoP included nine separate pages members could navigate. The home page was the first page that members saw when they logged in and is shown in Figures 3 and 4. This page included information about all recent activity from the members, links to other pages in the CoP as well as links to SWITCH social media for the broader community. These social media pages include Facebook, Twitter, and a blog created by ISU Extension and Outreach. Members could also access the SWITCH tracking website from the home page.

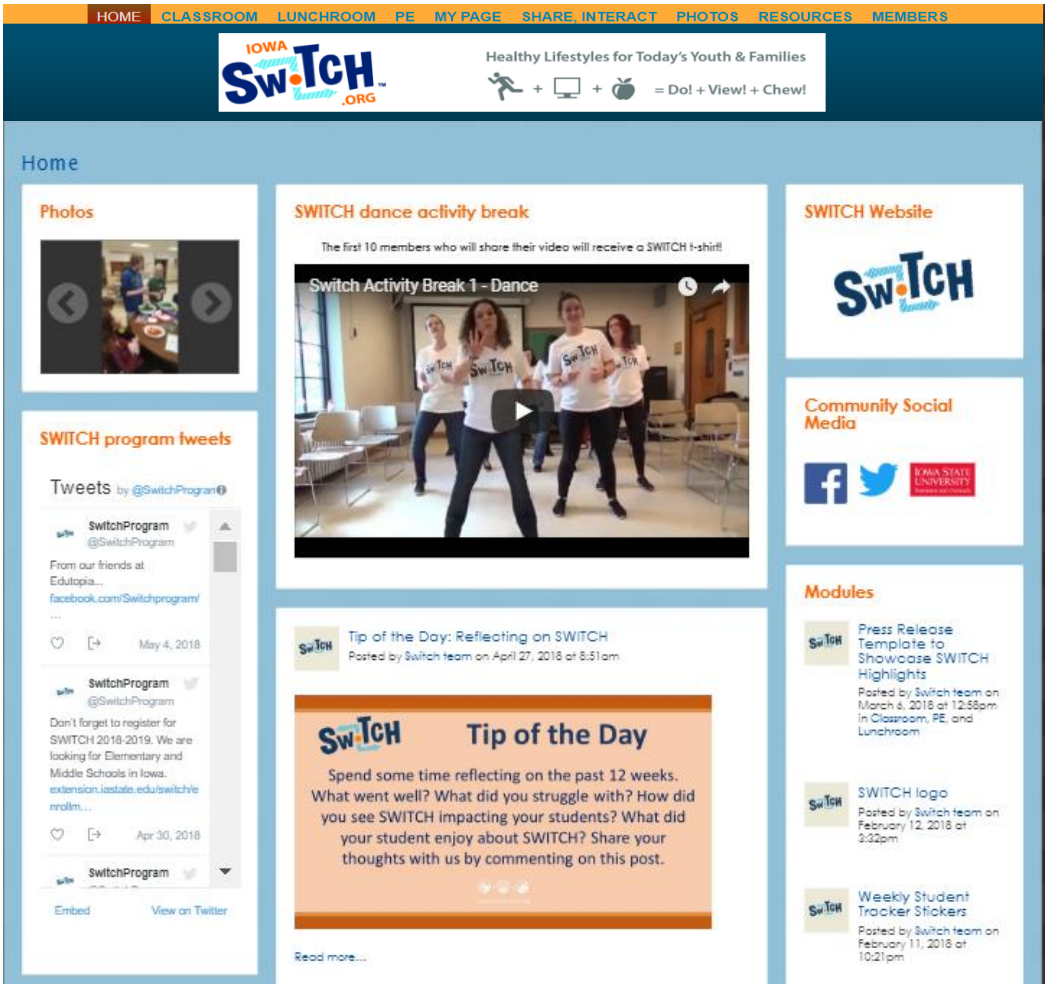

Figure 3: SWITCH CoP Home Page (a)

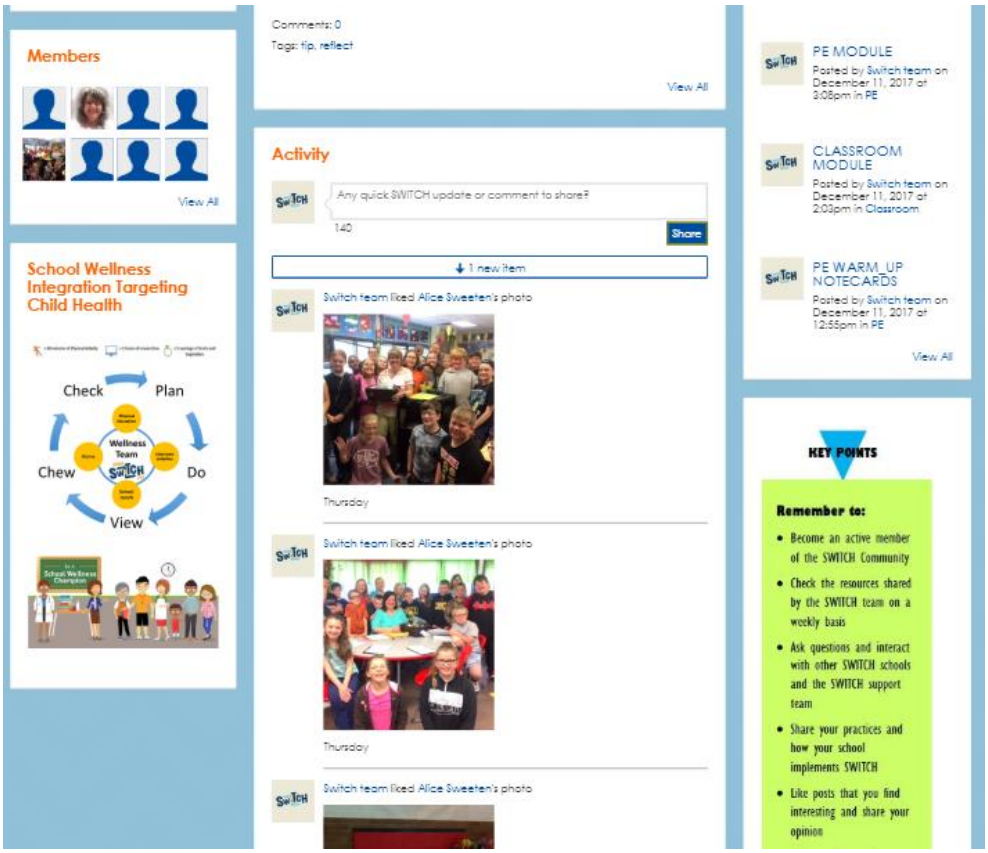

Figure 4: SWITCH CoP Home Page (b)

From the homepage, members could navigate to separate Classroom, Lunchroom, and PE pages. These pages included content specific to each area of practice, including respective classroom, lunchroom, and PE modules; weekly newsletters; and additional resources such as tools and strategies for incorporating nutrition and physical activity into the school day. Members could also access My Page, which took them to their member profile as shown in Figure 5. This page showed the individual's activity, posts, friends, and their personal information. On the Share, Interact page, shown in Figure 6, members could post content and view others' posts. When members added a post, they were asked to categorize their post as classroom, lunchroom, PE, school wellness in general, other, and general. When members

navigated to the Share, Interact page, they were provided with additional tabs corresponding to these categories. This enhanced usability as members could more easily find content specific to their desired interests. Members could also view all photos posted onto the CoP on the Photos page. The Resources page provided members with the daily SWITCH fun facts and tips, as well as SWITCH resources and past training webinars. These webinars were provided to members for continual reference and additional training opportunities for those unable to attend. Members could also access others' profiles through the Members page.

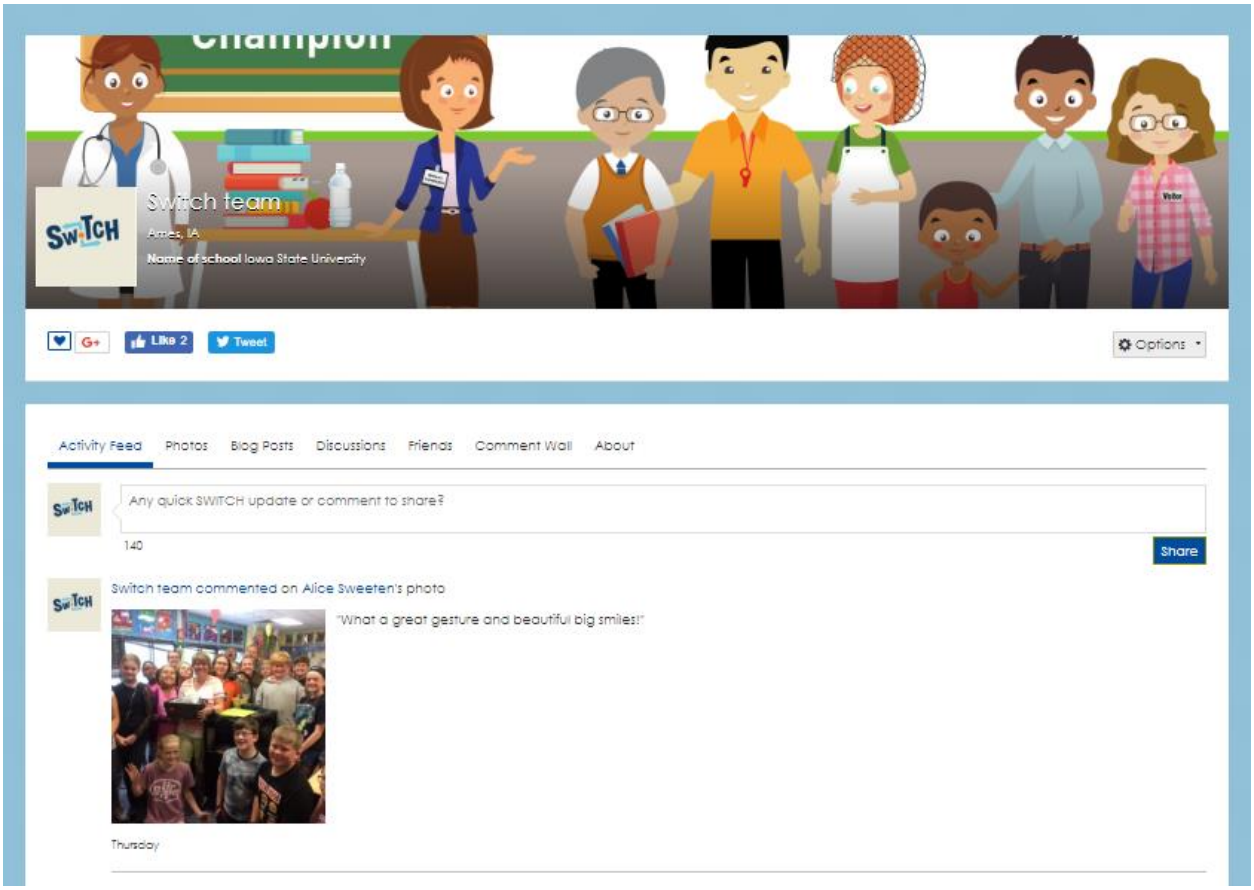

Figure 5: SWITCH CoP *My Page*

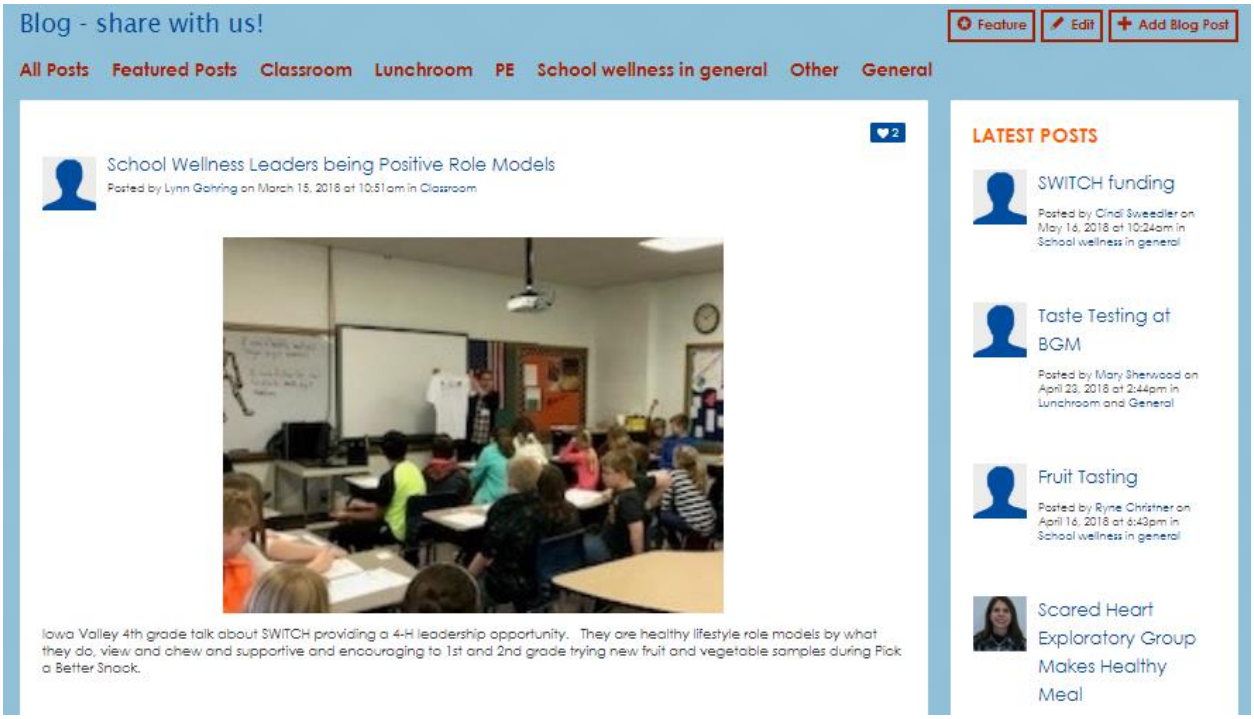

Figure 6: SWITCH CoP *Share, Interact* Page

3.3 SWITCH Team Facilitation

3.3.1 Newsletters

Each week, the SWITCH team posted respective classroom, lunchroom, and PE newsletters. These newsletters gave an overview of the week and offered encouragement, tips and reminders specific to the classroom, lunchroom, and PE. These aligned with DO, VIEW, and CHEW concepts and were created by research team members who developed the respective SWITCH modules. A welcome newsletter was also included with a checklist of items for school staff to complete in order to be prepared to launch SWITCH in their schools. The total number of newsletters posted onto the CoP was 39, with 13 each for the classroom, lunchroom, and PE. An example of a classroom newsletter is shown in Figure 7.

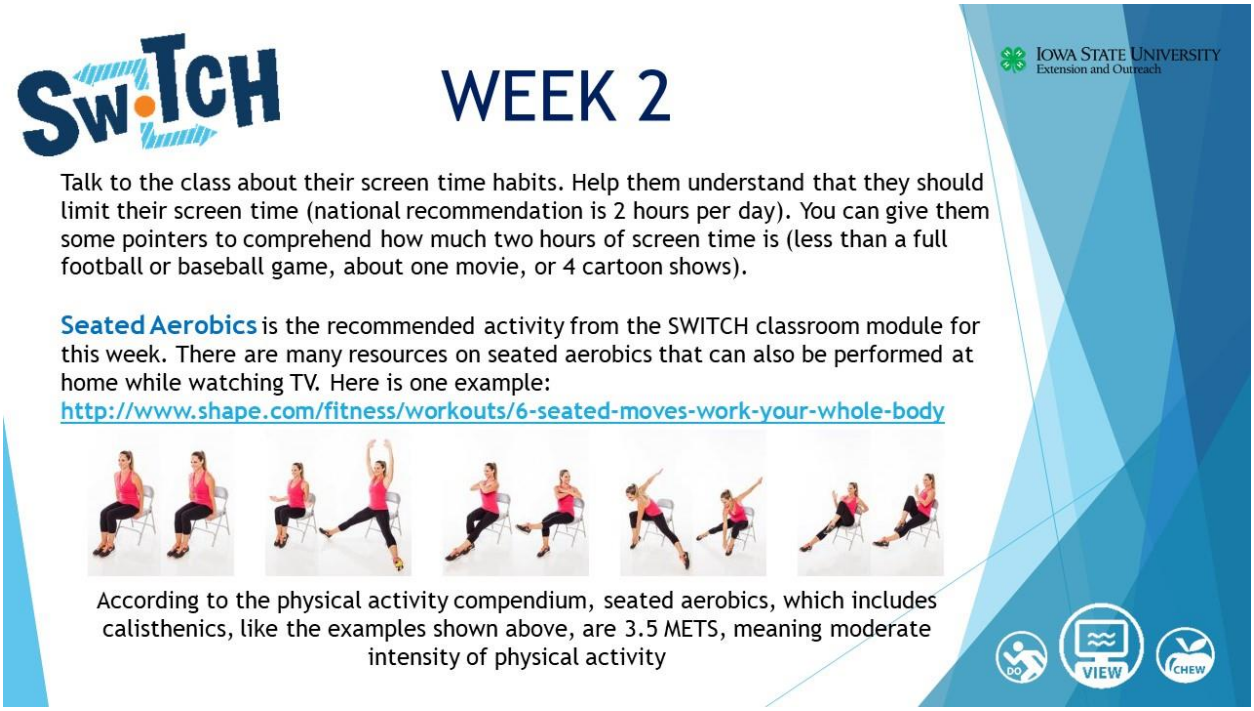

Figure 7: SWITCH CoP Weekly Newsletter

3.3.2 Tips and Fun Facts

Each school day, the SWITCH team posted either a Fun Fact or a Tip of the Day. Fun Facts were related to DO, VIEW, and CHEW concepts and were encouraged to be used for SWITCH posters in the schools. Tips of the Day were related to implementation of SWITCH in the schools and how to use the Ning website. In total, the SWITCH team posted 41 fun facts and 22 tips. Examples of each are provided in Table 1.

Table 1: Daily Fun Facts and Tips

Fun Facts
• *"How many red blood cells does your body produce in one second? 17 million! This is also increased when you're stressed!"* • *"Which insect supposedly tastes like spicy popcorn? Grasshoppers"* • *"Your body is make up of how much water? Your body is 61% water"*
Tips
• *"Previous SWITCH schools have reported that even taking as little as 15 minutes each week to connect and plan SWITCH school, classroom, lunchroom, and PE initiatives was highly beneficial. Consider meeting as a team each week to discuss plans, goals, and strategies for SWITCH."* • *"Some schools use media time, either in the classroom or computer lab, as a great way to have students track their DO, VIEW, and CHEW. How are you ensuring that students are completing the online trackers each week?"* • *"You can access the SWITCH modules and other resources right from the home page. Check them out under the Modules box on the right-hand side."*

3.3.3 Activity Break Dance

Members of the SWITCH team created an activity break dance that was filmed and posted on the CoP during Week 8. The purpose of this video was to give school staff an additional resource to incorporate into their practices and to encourage engagement in the CoP. Members were encouraged to perform the dance in their classroom or create their own dance and share a photo or video of their class performing it onto the SWITCH community. As an additional incentive, members who completed this would receive a SWITCH t-shirt.

3.3.4 Additional Support

To foster a feeling of support from the research team, the SWITCH team engaged with members on the CoP by ‘liking’ and commenting on members’ posts. Between the time points of one week prior to implementation and one week post-implementation, the SWITCH team provided a total of 78 ‘likes’ and 41 comments. Comments were encouraging and offered insight as to how posts were beneficial to other members. Examples of comments from the SWITCH team in response to members’ posts are shown below

- *"This is great! It looks like your students are learning a lot about nutrition. These are good ideas that other SWITCH members could use in their schools too. Thanks for sharing!"*
- *"Yes, this must have been a very educational trip! How did students respond?"*
- *"Wow! That's great to see students trying new foods. And they like them! Great idea to have them try new foods for the last CHEW week. Thanks for sharing."*

To promote a sense of belonging among members, the SWITCH team facilitated conversations and asked questions to allow members to become familiar with one another. A total of 16 additional resources, including activities to include in the school day and educational resources for the staff were posted by the SWITCH team. The purpose of this was to provide members with tools to assist with integrating SWITCH concepts and quality elements into their school and to encourage members to post resources of their own. The SWITCH team encouraged members not only to post outside resources but to post about their experiences with SWITCH in their school. These could include photos, videos, or written descriptions of activities, successes or difficulties, or any additional factor they desired to share. Additionally, the SWITCH

team sent a total of six emails throughout the 12-week implementation phase to all members as additional encouragement and reminders to post and engage with others on the CoP.

3.4 Data Collection and Processing

3.4.1 CoP Member Engagement

Engagement data were collected by observing the number of likes, comments, and posts provided by each member on the CoP. Based on the distribution of individual-level data, engagement was categorized as no engagement (0 posts), low engagement (1-5 posts), and high engagement (≥ 6 posts). Frequencies of members categorized in each level of engagement were identified for each school. Engagement was scored 0-2 with 0 representing no engagement and 2 representing high engagement. Mean engagement was calculated at the school-level in relation to the number of members on the CoP from each school. Engagement data were collected one week pre-implementation to one week post-implementation (January 2018-May 2018).

3.4.2 CoP Usability

Google Analytics was used to collect measures of CoP usability. Four factors were collected, including Number of Sessions, Pages per Session, Average Session Duration and Page Views. A Session was determined by active engagement with the website. If the webpage remained open with no activity, the session ended after 30 minutes. Pages per Session was determined by the average number of pages viewed in a single session, where repeated views of a single page were included. Average Session Duration was determined by the average length of time of a single session.

Page Views was determined by the total number of pages viewed throughout implementation.

Data from Google Analytics was presented by city and matched to each SWITCH school. Given the possibility of commuting staff visiting the CoP away from school, cities outside the identified location of the school were matched with the nearest school within a 40-mile radius. Cities unable to be matched were excluded from the school-level analysis. Ames was also excluded from the analysis as these points of activity were created by the SWITCH research team. All data was collected at the city-level, and data corresponding to each school were aggregated to represent school-level activity. Sessions, Pages per Session, and Average Session Duration were collected each week and for the overall implementation period. Page Views were collected for the overall implementation period to determine page traffic.

3.4.3 *School Use and Impact*

School use and impact was determined through two checkpoint surveys. The first survey was administered to core teams at the halfway point of SWITCH. (*Please indicate how often each SWITCH staff member used the Community of Practice during the last month of SWITCH.)* Responses were provided on a three-point scale (*0 = not at all; 1 = 1-2 weeks; 2 = every week*). This survey evaluated perceptions of CoP use of classroom teachers, PE teachers, and foodservice representatives. The second checkpoint survey was administered to core teams at the end of SWITCH implementation and assessed school use (*Did your school use the Community of Practice (Ning website)?)* and perceived importance of the CoP (*How important was the Community of Practice as a school wellness resource for SWITCH programming in your*

school?). The former question was rated on a 4-point scale *(1 = not at all; 4 = yes, to a great extent (almost daily)),* and the latter was rated on a 5-point scale *(1 = very unimportant; 5 = very important).* Results from the checkpoint surveys were evaluated by determining the frequency of identified responses of use for each role (PE teacher, classroom teacher, and foodservice representative) as well as for each school. The overall mean and school-level mean of responses was also determined for use and importance.

3.4.4 Perceived Value and Barriers

Perceptions and barriers to using the CoP were determined through the Perceived Value and Barriers Survey administered through Qualtrics. This survey was administered to CoP members and to the core teams at the end of SWITCH implementation. If members completed the survey and provided their email address they were entered into a drawing to receive one of five $50 Amazon gift cards.

This survey consisted of 34 questions overall and included shorter versions of existing valid questionnaires to avoid putting excessive requests on staff who were engaged in the already multi-component SWITCH intervention. Demographics included school name, gender, role at school, and years in the current role. Value and interest consisted of four questions from the Intrinsic Motivation Inventory Survey (IMI; McAuley, Duncan, & Tammen, 1989), with two questions on value (e.g., “I believe the SWITCH CoP was of great value to the SWITCH program”) and two on interest/enjoyment (e.g., “I enjoyed participating in the SWITCH CoP”). Perceived support was based on the Learning Climate Questionnaire (LCQ; Williams & Deci, 1996) and included five questions that measured how supported participants felt in the CoP. Example questions

are “I felt listened to on how I would like to do things by the SWITCH CoP”, and “I felt the SWITCH CoP provided me with choices and options”. Sense of belonging was measured with the Sense of Belonging for Virtual Learning Community Questionnaire (Zhao et al., 2015). The scale includes four factors (Familiarity, Perceived Similarity, Trust in Other Members, and Sense of Belonging) with 3-4 questions in each factor. In this study, two questions from each factor were use. Questions related to value and interest, support and sense of belonging were all rated on a 5-point scale (1 = strongly disagree, 5 = strongly agree). Intentions to use the CoP in the future was measured with a single item and a yes/no option for an answer. Additional questions included reasons for using the CoP, use of other social media platforms (Facebook and Twitter) to communicate about SWITCH, and receptiveness of receiving reminder emails. Lastly, 14 questions on perceived barriers in using the CoP were developed based on the literature and the uniqueness of the structure of the SWITCH CoP. Barriers were presented in relation to communication, effort, self-competence, technology, and interest and were all rated on a 4-point scale (1 = not at all, 4 = large extent). An open-ended question was also provided for any additional barriers that were not presented in the survey. Those who reported to not having become members of the CoP were provided a shorter version of the Perceived Value and Barriers survey. This shorter version included demographic information and assessment of barriers to using the CoP. The full survey is presented in Appendix 2. Results from this survey were processed by determining the frequencies and means of all identified responses. Figure 8 presents the timeline for data collection throughout the 12-week SWITCH implementation.

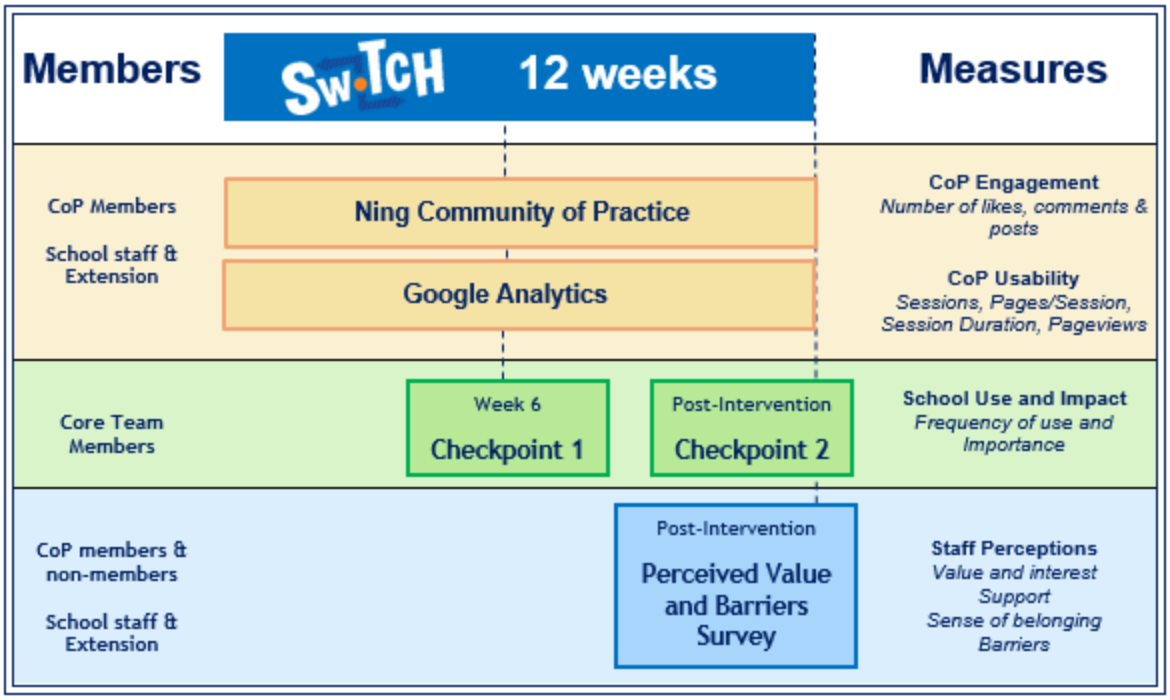

Figure 8: Timeline of data collection

3.5 Data Analysis

Data collected through Google Analytics were analyzed to determine usability. Total sessions, average session duration, average pages per session and pageviews were each aggregated among all CoP members to represent overall website usage and traffic. Descriptive statistics including frequencies, percentages and Mean with Standard Deviation (when appropriate) were computed and reported for all survey variables. Analyses were conducted at the school level for the data collected through checkpoint surveys and at the individual level for the perceived value, support, barriers, and intentions, that were collect through the Perceived Value and Barriers survey. Measures of correlation were used to determine relationships among factors presented in the Perceived Value and Barriers survey, including value and interest, support, belonging, familiarity, similarity, trust and intention to use the SWITCH CoP in the future. Additional

measures of correlation were conducted to determine the relationship between each of these survey factors with obstacles, level of engagement and checkpoint survey responses of use and perceived importance. All correlations were determined through a two-tailed Pearson Correlation. Data were analyzed using SPSS.

CHAPTER 4

RESULTS

4.1 CoP Member Engagement

CoP membership consisted of 70 individuals (85.7% female), between the ages of 18 and 69, representing 23 of the 25 SWITCH schools. Membership was largely comprised of classroom teachers (32.9%) and members of ISU Extension (21.4%). Individuals from the SWITCH research team were members on the CoP but were excluded from the analysis. Member demographics can be found in Table 2.

Table 2: SWITCH CoP Member Demographics

Measure	Count (%)
Gender	
Male	10 (14.3)
Female	60 (85.7)
Age	
18-29	13 (18.6)
30-39	17 (24.3)
40-49	13 (18.6)
50-59	18 (25.7)
60-69	5 (7.1)
Not given	5 (7.1)
Role	
Classroom Teacher	23 (32.9)
PE Teacher	8 (11.4)
Food Service Director/Manager/Coordinator	3 (4.3)
Nurse	4 (5.7)
Guidance Counselor	2 (2.9)
Principal/Administrator	3 (4.3)
Paraprofessional	1 (1.4)
ISU Extension	15 (21.4)
Not given	7 (10)
Other	2 (2.9)

Of the 70 total CoP members, 23 (32.9%) actively engaged to some extent and the remaining 47 (67.5%) members displayed no engagement, meaning sharing no

posts or comments. Table 3 presents member engagement for each role represented in the CoP. The majority of those engaged were teachers (34.8%) and extension members (21.7%).

Table 3: CoP Member Engagement by Role

Role	Count (%)
Classroom Teachers	8 (34.8)
Extension	5 (21.7)
Nurses	3 (13)
Paraeducator	1 (4.3)
PE Teacher	1 (4.3)
Principal	1 (4.3)
Other	1 (4.3)
Not given	3 (13)

Figure 9 illustrates the number of engaged members from each school in relation to the total number of members from that school. Of the 25 total schools participating in SWITCH, 23 were represented with at least one member. Sixteen schools had at least one engaged member, with the remaining five schools presenting members with no engagement. Schools 19 and 25 presented the most members; however, a majority of these members were classified as unengaged (85.7% and 71.4% respectively).

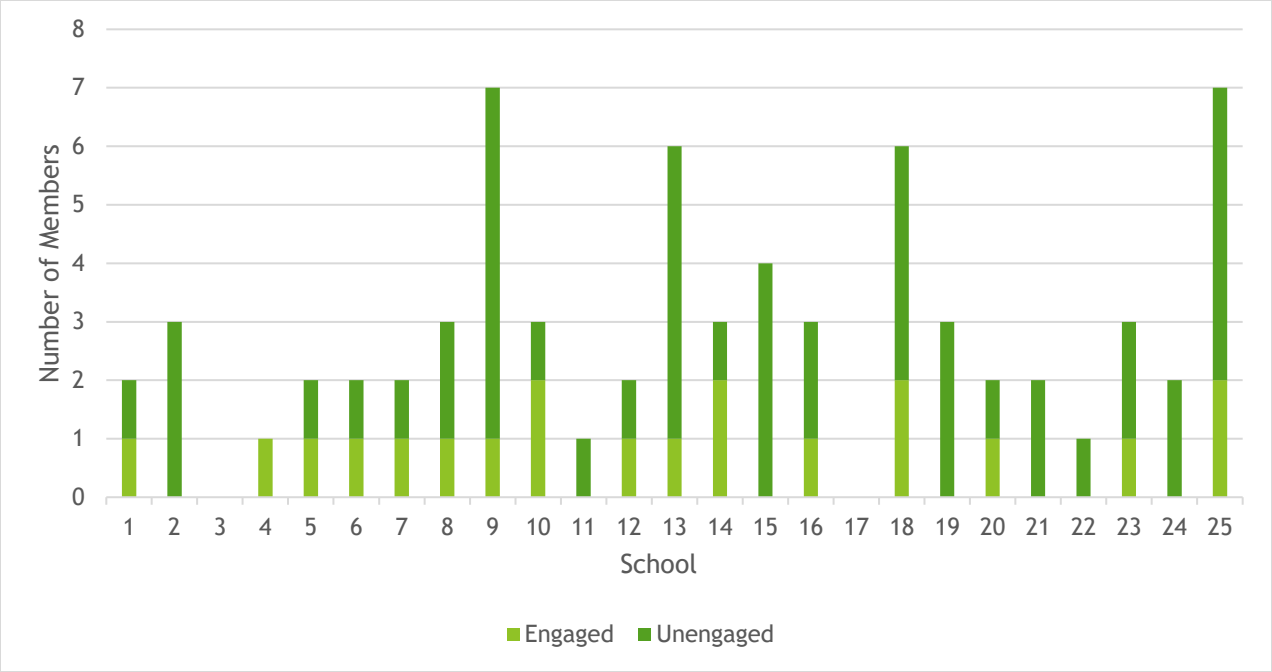

Figure 9: School-level member engagement

Engagement was seen through likes, comments, and posts, with the majority of engagement presented as posts. The posts included photos and examples of how schools were implementing SWITCH. Questions to other schools and the SWITCH team as well as multiple comments within one post were rare. Comments mainly included positive remarks from one school to another, such as “this looks great.” In-depth communication with the goal of problem solving among members was absent.

Total likes, comments, and posts were tracked for each member throughout each week of SWITCH implementation. Figure 10 represents the total number of each of these elements among all members for each week. Reminders to visit and post on the CoP were sent to all members via email at the beginning of weeks 1, 4, 8, 9, 11, and 12. Figure 10 illustrates increased engagement in relation to these email reminders where dotted lines represent weeks in which these email reminders were sent.

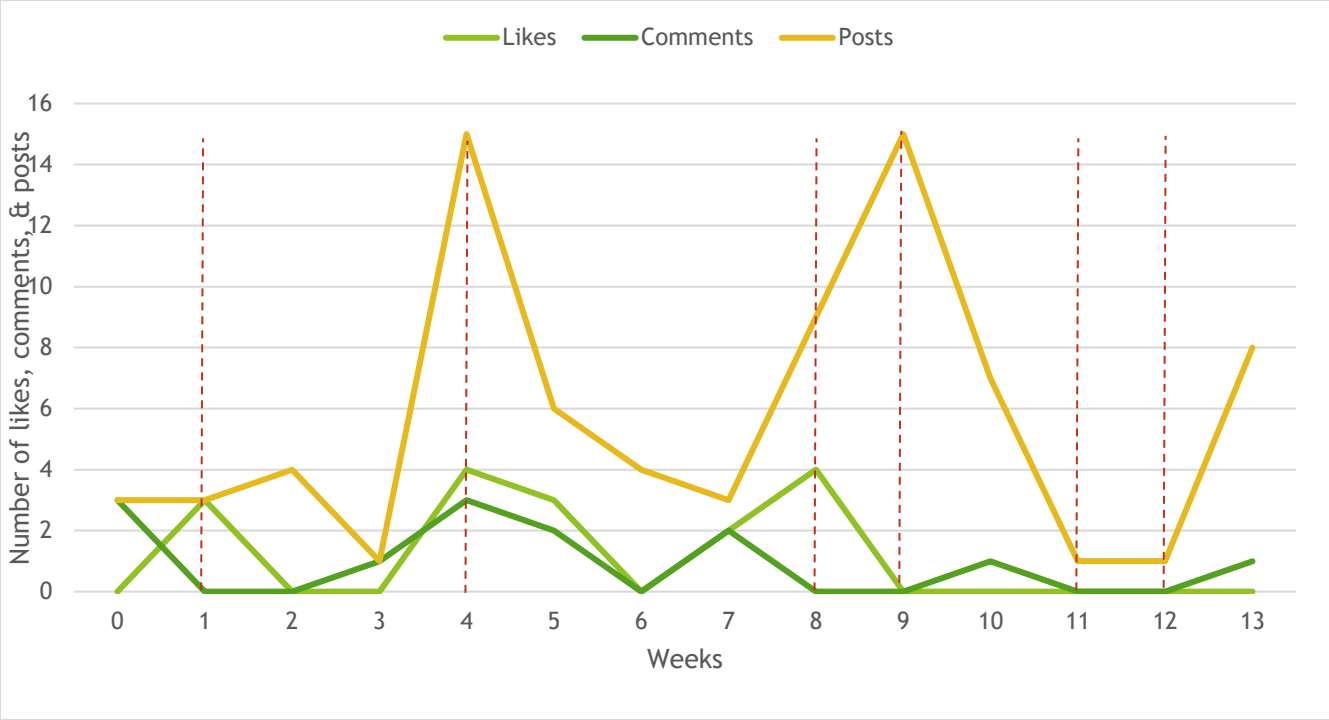

Figure 10: Total Likes, Comments, and Posts; ⋮ = email reminders

4.2 CoP Usability

Usability of the CoP was measured with Google Analytics software. Throughout the 12-week implementation phase there was a total of 620 sessions, meaning separate visits on the CoP. Across all sessions, the average session duration was 3 minutes 34 seconds with an average of 4.67 pages per session. The most viewed page was the home page with 890 total page views. Following was the Classroom page with 136 page views. The greatest amount of time was spent on the Classroom and Photos pages. Further results are presented in Table 4.

Table 4: Page Views and Average Time on Page of the Most-Visited Pages

Page	Page Views	Avg. Time on Page
Home	890	0:00:39
Classroom	136	0:01:29
Lunchroom	109	0:01:05
Facts of the Day	109	0:01:15
Photos	102	0:01:21
Share, Interact	87	0:00:34
PE	84	0:01:07
Resources	76	0:00:35
Members	32	0:00:14

4.3 School Use and Impact

Core teams assessed the degree of CoP use of classroom, lunchroom, and PE leaders within the school from the first checkpoint survey. Responses were provided for 24 of the 25 SWITCH schools. These assessments represented 135 total school staff comprised of 87 classroom teachers (64.4%), 24 PE teachers (17.8%), and 24 foodservice representatives (17.8%). Nearly half of all schools reported individuals visiting the CoP every week (48%). In total, 57.02% were assessed by the core teams to have visited at least 1-2 times in the past month and 22% to have visited weekly. Classroom teachers and foodservice representatives were most frequently assessed as not visiting at all (40% and 62.5% respectively), while assessments of PE teachers revealed an even distribution of 33.33% among all three responses (not at all; 1-2 times; weekly). Twenty-one percent of classroom teachers and 16.7% of foodservice representatives were assessed to have visited every week. Of the three groups represented in the checkpoint survey, PE teachers had the largest proportion of members to visit every week (33.33%). Three schools reported not visiting the CoP at all, and one school reported that all assessed individuals visited every week.

From the second checkpoint survey, core teams assessed the degree of use and importance of 33 total school staff from various roles within the school. Roles of these staff are represented in Table 5. Responses were provided for 20 of the 25 SWITCH schools. A majority (62.5%) were assessed as using the CoP to a small extent (less than weekly), and 9.4% visiting to a moderate extent (weekly), while the remaining 28% not using it at all. No respondents were reported as using more than once a week. The mean response for member use was 1.63 on a 4-point scale. Although use was relatively low, survey responses revealed the CoP as an important resource for SWITCH, with 30.4% reporting very important, 39.1% reporting moderately important, 23.1% reporting slightly important, 39.1% reporting moderately important 30.4% reporting very important, and 4.3% reporting extremely important. The mean response for perceived importance was 3.13 on a 5-point scale. Importance was found to be highly significantly correlated with self-reported use and value and interest ($p < 0.01$).

Table 5: Staff Roles Represented in Final Checkpoint Survey

Role	Count (%)
Classroom Teacher	13 (39.39)
PE Teacher	6 (18.18)
School Nurse	6 (18.18)
Principal/Assistant Principal	3 (9.09)
Other	2 (6.06)
Administrative Assistant	1 (3.03)
Guidance Counselor	1 (3.03)
Paraprofessional	1 (3.03)

4.4 Perceived Value and Barriers

Cronbach's alpha ratings of reliability for factors of the Perceived Value and Barriers Survey are shown in Table 6. Responses were provided by 22 of the 25 SWITCH schools. The sample of responses consisted of 43 school staff (83.7% female)

with 79.1% of those as members of the CoP and 20.9% non-members. This sample consisted mostly of classroom teachers (27.9%) and PE teachers (23.3%). Additional demographic information of survey participants are presented in Table 7.

Table 6: Cronbach alpha ratings of reliability for the subscales of the Perceived Value and Barriers Survey

Factor	Cronbach Alpha
Value and Interest	0.866
Support	0.885
Belonging	0.92
Obstacles	0.93
Communication	0.776
Effort	0.821
Self-Competence	0.909
Technology	0.839
Interest	0.932
External Factors	0.795

Table 7: Perceived Value & Barriers Survey Participant Demographics

Measure	Count (%)
Gender	
Female	36 (83.7)
Male	7 (15.8)
Age	
18-29	5 (11.6)
30-39	14 (32.6)
40-49	7 (16.3)
50 and above	17 (39.5)
Role	
Administrative Assistant	1 (2.3)
Classroom Teacher	12 (27.9)
Foodservice Director	3 (7.0)
Guidance Counselor	1 (2.3)
School Nurse	7 (16.3)
Other (Extension)	6 (14.0)
PE Teacher	10 (23.3)
Principal	4 (9.3)
CoP Membership	
Members	34 (79.1)
Nonmembers	9 (20.9)

It was found that 23.2% of survey respondents used the CoP once per week or more, 7% every other week, 25.6% once a month, 32.6% not it at all, and 11.6% did not

provide an answer. Compared to other social media platforms (Facebook and Twitter), members identified using the CoP more frequently to communicate about SWITCH. Where 23.3% reported using the CoP at least once per week, 4.7% reported using Facebook and 2.3% reported using Twitter at least once per week. A majority of individuals reported not using Facebook or Twitter at all (51.2% and 65.1% respectively). The most cited reason for which members used the CoP was to check posts (71.9%), to find resources (65.5%), and to read tips (56.3%). Members also reported using the CoP to read the weekly newsletters (34.4%). Descriptive statistics for perceived value, support, and intention are presented in Table 8. The highest reported overall factor was Value and Interest (M = 4.32 ± 0.819), followed by Support (M =4.24 ± 0.867). Belonging was the lowest identified of the overall factors; however, the sub-factor of Trust was the largest identified of all factors and sub-factors (M=4.52± 0.664). Overall, 91.2% of individuals reported intentions to continue to use the CoP if they implement SWITCH in the future.

Table 8: Means and Standard Deviations of Factors and Sub-Factors of the Perceived Value & Barriers Survey

Factor	Mean + SD
Support	4.24 ± 0.867
Value and Interest	4.32 ± 0.819
Belonging	4.09 ± 0.820
Familiarity	4.05 ± 0.925
Similarity	4.18 ± 0.842
Trust	4.52 ± 0.664
Sense of Belonging	4.03 ± 0.903

Rating scale 1-5 for all factors

Mean responses of all identified obstacles are presented in Table 9. Specific obstacles presented in the survey can be found in Appendix B. The mean of all obstacles was 1.94 with Standard Deviation of 0.589. The most identified obstacles

were found to be related to areas of effort, usability, and self-competence. The greatest overall obstacle was *I didn't have extra time to search for information online (*M=2.43 ± 0.899). Reports of obstacles were similar among CoP members and non-members; however, non-members reported "I was not informed or reminded frequently to visit" to a greater degree than members (M=2.44). An open-ended question was provided to report additional obstacles; however, none were identified. Regarding intention, the majority of respondents reported that they will use the SWITCH ning Community if they implement the SWITCH program in the future (72.1%). Lastly, respondents also appeared supportive of receiving emails as reminders to visit the CoP if they implement SWITCH in the future. Twenty-six percent were responsive to receiving emails once a month, 14.7% every other week, and 52.9% once a week.

Table 9: Means and Standard Deviations of All Obstacles

Obstacle	Mean
I didn't have extra time to search for information online	2.43 ± 0.899
I didn't feel I had anything to share or comment	2.22 ± 0.959
Visiting and posting required a lot of extra effort	2.17 ± 0.891
I didn't feel confident in sharing content	2.14 ± 0.990
It was hard to visit as it was not embedded with the SWITCH tracking website	2.08 ± 0.967
I was not informed or reminded frequently to visit it	2.03 ± 0.944
I was not sure about the purpose	1.92 ± 0.829
It was hard to find information (the platform was not user friendly)	1.88 ± 0.893
The content wasn't important (I had the information I needed)	1.86 ± 0.899
I worried that my posts might not be perceived as interesting	1.78 ± 0.787
My colleagues didn't participate, so I didn't either	1.74 ± 1.039
I don't like communicating with others through digital technology	1.72 ± 1.003
The content that was shared was not of interest to me	1.69 ± 0.832
I don't have easy access to internet	1.33 ± 0.793

4.5 Associations among factors

Table 10 presents the correlations among all survey factors and sub-factors with overall obstacles and intentions to use the SWITCH CoP in the future. Intention was negatively coded with a response of 0 indicating intentions to continue to use the CoP in

the future, and a response of 1 indicating no intentions. Therefore, negative correlations for intention presented in Table 10 represent truly positive correlations. Table 11 presents correlations among survey factors with engagement, use and importance. Significant negative correlations were observed between all factors and obstacles ($p < 0.05$) with the exception of Familiarity and Sense of Belonging. Value, support, and belonging were all found to be significantly correlated with level of engagement ($p < 0.05$), whereas obstacles were negatively correlated with engagement ($p < 0.01$). Engagement was correlated to the largest extent with obstacles ($r = -0.649$) and support ($r = 0.546$).

A significant correlation was found between intentions to use the CoP in the future and obstacles relating to technology (Ob 8 $p=0.028$; Ob 11 $p = 0.010$) and effort (Ob 10 $p = 0.048$); however, correlation did not exist between all obstacles and intentions to use the CoP in the future ($p = 0.073$). Significant negative correlation existed between intentions to use the CoP in the future and all factors and sub-factors. Intention was correlated to the largest extent with value and interest ($r = -0.693$) as well as sense of belonging ($r = -0.626$). Those who perceived the identified factors to a greater extent, reported to have greater intentions to using the CoP in the future (Table 10).

Table 10: Correlation Coefficients of Factors and Sub-Factors related to Obstacles and Intentions to Use the SWITCH CoP in the Future

	Belonging	Value & Interest	Support	Familiarity	Similarity	Trust	Sense of Belonging	Obstacles	Intention
Belonging	1								
Value & Interest	0.922**	1							
Support	0.836**	0807**	1						
Familiarity	0.899**	0.758**	0.662**	1					
Similarity	0.939**	0.907**	0.802**	0.759**	1				
Trust	0.648**	0.631**	0.741**	0.363*	0.674**	1			
Sense of Belonging	0.927**	0.890**	0.852**	0.716**	0.847**	0.663**	1		
Obstacles	**-0.421***	**-0.474***	**-0.416***	-0.277	**-0.473***	**-0.495****	-0.367	1	
Intention	**-0.621****	**-0.693****	**-0.567****	**-0.497****	**-0.597****	**-0.408***	**-0.626****	-0.332	1

*p < 005; **p<0.01. Intention has a reverse scoring with 0=intent to use the CoP and 1=do not indent to use CoP.

Table 11: Correlation Coefficients of Survey Results related to Engagement, Use, and Importance

	Support	Value & Interest	Belonging	Obstacles	Checkpoint Survey 1	Engagement	Use	Importance
Support	1							
Value & Interest	0807**	1						
Belonging	0.836**	0.922**	1					
Obstacles	-0.416*	-0.474*	-0.421*	1				
Checkpoint Survey 1	-0.373	-0.140	-0.360	0.200	1			
Engagement	**0.546***	**0.444***	**0.463***	**-0.649****	-0.215	1		
Use	0.397	0.755**	0.536*	-0.567*	-0.099	0.396	1	
Importance	0.101	0.645**	0.487	-0.229	0.043	0.149	0.696**	1

*p < 005; **p<0.01.

CHAPTER 5

DISCUSSION

Due to the large prevalence of childhood obesity, prevention strategies often target the school environment as this setting has the potential to reach the largest amount of the youth population. (CDC, 2017). Most school staff often do not have formal training in educating students on the topics of nutrition and physical activity. Implementing new strategies, such as CSPAP wellness programming, can often prove to be overwhelming for school staff. Teachers value promoting healthy behaviors in their students, but they report a need for sufficient training and support to do so. For this reason, supporting school staff continually throughout CSPAP implementation is of great importance. However, there is a lack of research targeting staff trainings in CSPAP wellness programs.

The purpose of the present study is to examine the feasibility of an online CoP as a strategy to support staff in implementing CSPAP wellness programming. Specifically, we identified level of implementation, members' perceived value, and obstacles to participation. Through the tracking of member activity, website traffic, and self-reported use, we were able to determine the level of implementation. Through the use of self-report surveys, we were able to determine perceived value and obstacles to participation from both CoP members and non-members.

Results from the first checkpoint survey were inconsistent with what was seen from the CoP and Google Analytics. For example, School 2 reported ten school staff visiting the CoP at least once in the previous month. However, this school had only

three members on the CoP. Similar findings were present for other schools as well. Additionally, responses from School 1 indicated no school staff to have visited the CoP; however, activity was present for this school. Midway checkpoint responses were not found to be correlated with any other findings. Due to the high amount of error between self-report and the objectively measured data, results from this checkpoint survey should be viewed with discretion.

Overall, the level of activity on the CoP appeared very promising. Schools visited to a large extent (620 sessions) and the average time per session was high (3.3 minutes). Members interacted with the CoP as evidenced by an average of 4.67 pages viewed per session. These finding indicate that on average, members are migrating throughout various pages on the CoP and spending time on those pages, likely reading, viewing photos and gathering information. It is expected that the homepage was highly visited as this page contained a large amount of content, and this is where members could get an overview of what had been shared recently. The classroom page was the most visited. Additionally, Lunchroom; Facts of the Day; Photos; and Share, Interact pages were highly viewed. These findings indicate the value of these pages and support that they should be maintained in future implementation.

As shown in figure 9, nearly all schools had at least one representative become a member of the CoP. Similarly, a majority of those representatives engaged with the CoP to some extent. A large majority of engagement was seen as posts showcasing members' practices of how schools were implementing SWITCH. Though active engagement was overall low, the present findings can be considered encouraging as a first-year implementation. Interaction among members through likes and comments was

present but limited. There was a lack of in-depth communication through questions and problem-solving. This can be attributed to the support that members were receiving from the SWITCH team through one-on-one checkpoint discussions. It is likely that members didn't have a need to ask questions on the CoP because of this support from the SWITCH team.

Findings show that on average, CoP members trusted the SWITCH research team (M=4.52) and felt supported by the research team (M=4.24). According to Zhao et al (2012), the four sub-factors of belonging are trust, familiarity, similarity, and sense of belonging. In the case of this present study, trust appears to differ from the other three sub-factors. It was observed that Trust, as presented in the Perceived Value & Barriers survey, was presented to a larger extent as trust in the SWITCH team as opposed to trust in the other members of the CoP. This supports the role of the facilitator in online communities as facilitators are able to offer school staff the support and resources they need when implementing new strategies (Beighle et al., 2013).

Facilitation of the SWITCH CoP was implemented through strategies such as posting weekly newsletters, sending reminder emails, liking and commenting on members' posts, providing tips on how to navigate the CoP, and encouraging members to post content. Reminder emails were seen to be an effective strategy as engagement increased after each email reminder. Members indicated that they would be receptive of receiving reminder emails at least once a week if they were to implement SWITCH in the future. Visiting the CoP had not become a habit for members, indicating the need for reminders from the research team. The finding that members are receptive to receiving

reminder emails at least once a week is important as this is a strategy that should continue to be implemented in the future.

These strategies were specifically utilized to support members as they are implementing SWITCH in their schools. Members of online communities identify support as one of the greatest gains and an essential aspect of these communities (Tang & Lam, 2014). Support provided specially by intervention teams of wellness programming are also perceived by members as being extremely valuable. Egan et al. (2017) found that personalized emails to school staff implementing the PACES intervention resulted in staff perceiving that the intervention team cared about their success and that they would offer support and assistance when needed. The SWITCH CoP utilized similar strategies through sending emails and interacting personally with members through liking and commenting on posts. Results of this study support the strategies used in facilitating the SWITCH CoP to foster members' perception of support and trust.

Obstacles to participating and engaging in the CoP were identified both by members and non-members. The overall mean of all 14 identified obstacles was 1.94. This supports the feasibility of the SWITCH CoP as no substantial obstacles to participation and engagement were present. The greatest reported obstacle was *I didn't have extra time to search for information online* (M=2.43 ± 0.899). The largest obstacles presented themselves as being related to the amount of effort required of participating in the CoP, usability of the CoP, and self-competence in sharing content. Non-members reported to a greater degree that they identified with "*I was not informed or reminded frequently to visit" (*M=2.44). This stresses the importance of future SWITCH implementation to ensure that all school staff are receiving adequate information about

the CoP and regular reminders to visit. These findings are consistent with the research in barriers to participating in online communities. Commonly cited barriers include fear of being criticized by other members, insecurities in sharing one's own ideas, fear of members perceiving their content as inaccurate or irrelevant, lack of direction, and lack of time (Macia et al., 2016, Williams & Jacobs, 2004; Ardichivili, 2002).

There was also found significant correlations between obstacles as they relate to perceptions of support, belonging, trust, and value and interest. The greater individuals reported identifying with these factors, the less they identified with the presented obstacles. It can be concluded that when members feel a greater sense of support, belonging, trust, and value, they are more capable of overcoming the obstacles that are presented to them. It was also found that these factors may facilitate prolonged participation as they were found to be significantly correlated with intentions to participate in the SWITCH CoP in the future. This is consistent with the literature that states that intentional and actual prolonged participation in online communities are influenced by social support, satisfaction and perceived value of a community (Shampy & Rahman, 2017).

Our findings show that even though the overall implementation was moderate to low in some cases, the number of sessions and the average time per session can be considered promising. Though there is certainly room for improvement regarding the level of engagement and participation, it should be taken into account that this was the first year the SWITCH CoP was used. Nevertheless, and most importantly, the members viewed the CoP as very important, which was shown both in the second checkpoint survey with the core teams and the Perceived Value and Barriers survey

with the overall school staff. Tang et al. (2014) found that members' perceived value of online communities affects their engagement with the community. Those who perceived the community as less valuable showed lower engagement. School staff involved in SWITCH view the CoP as valuable which shows great potential for future implementation of the SWITCH CoP.

Previous findings show engagement in online communities to be difficult to achieve in CSPAP interventions. One study revealed next to no engagement in an online community intended to support elementary PE teachers to implement CSPAP in their schools. Teachers were supported continually throughout a 12-month period through multiple avenues in addition to an online community. Teachers were initially supportive of the online community and intended to join; however, only one teacher joined and didn't participate. This lack of participation was attributed to lack of trust in other members and barriers to using technology (Centeio, Erwin, & Castelli, 2014). An additional look into unsuccessful CoPs found that many lack one-to-one interaction (Probst & Borzillo, 2008). Results of this thesis are consistent with this finding as engagement between members was scarce. Given these findings, there is evidence of difficulty in creating successful online communities.

Probst & Borzillo (2008) also found that members of unsuccessful CoPs do not value them as meaningful for their daily work, and members fail to showcase their practice in a way that helps other members visualize and understand. In contrast, findings from this thesis reveal success in these areas. Members found the CoP extremely valuable and important, and those who were engaged frequently posted photos and examples of their practices with SWITCH implementation in their school.

Additional evidence shows that a web-based, private social networking platform designed to support pre-service classroom teachers to promote physical activity can promote enjoyment and value for the CoP, as well as facilitate intentions for prolonged use and intentions to integrate PA in future classrooms (Vazou, Hutchinson, & Webster, 2015). Given these findings, results from the present thesis show promise in the use of CoPs to successfully support school staff in CSPAP implementation.

The key finding from this thesis was the high level of value reported from ‘both the second checkpoint survey and the Perceived Value and Barriers Survey. Members of online communities report that perceived value of the community affects their engagement. Less active members perceive online communities as time-consuming and less valuable than more active members (Tang et al., 2014). The less an individual values an online community, the less likely they will be motivated to engage. In addition to the reported value of the CoP, the lack of substantial obstacles is positive and supports its feasibility. Though improvements are needed to increase member engagement, the high level of value reported by both members and non-members shows promise for the future of the SWICH CoP and for the use of CoPs as a strategy to support staff in CSPAP implementation. Future strategies should aim to focus on enhancing member engagement from the results of the present thesis. A specific strategy may include suggesting in the best practices to share at least one post on the CoP as a way to encourage engagement.

5.1 Limitations

When gathering activity data, Google Analytics identified activity in cities that could not be directly matched to a school. These cities were matched to the closest

school within a 40-mile radius under the assumption that school staff who commute to work from another city may have visited the CoP from home. As we were not provided the exact location for all members, we were unable to match these cities with absolute certainty. Another limitation was the lack of tracking members' activity at the individual level. However, due to privacy policy, that level of tracking was not feasible. In the future, approval to track visits to the CoP through Google Analytics at the individual level is encouraged. Further, the communication for participation in the SWITCH CoP was done through the Core Teams for each school. It is not clear if and how the Core Teams communicated the participation in the CoP with all the school staff who were not in the Core Team. It is possible that school staff did not receive the same level of information about the CoP from the Core Teams. Future studies should address this limitation.

5.2 Future Research

Results of this study provide a great deal of insight into future implementation of the SWITCH CoP. The greatest obstacles identified were in relation to effort, usability, and self-competence. Future implementation of the SWITCH CoP can work to improve the usability of the online platform through integrating the CoP within the tracking website. Improving usability in this way could potentially lessen the perception of effort as an obstacle. Future implementation can also target specific strategies to improve members' self-competence. Similarly, as results identified significant negative correlations between all obstacles with support, belonging, trust, and value and interest, future implementation can identify specific strategies to target members' perceptions of these factors.

Future research may also consider evaluating a greater amount of individual-level data on both members who showed high engagement and those who showed low engagement. This may be conducted as semi-structured interviews to better understand members' wants and needs to enhance engagement. As this is a novel approach for school staff engagement in an intervention, a combination of quantitative and qualitative methods should be employed in the future for more in-depth understanding of how CoPs work or should work. Additionally, future research may consider evaluating the impact of the CoP on overall SWITCH implementation, as well as the level of CoP implementation between intervention and control schools. Future research may also evaluate the impact of the level of engagement on the CoP with student behaviors, such as tracking Do, View, and Chew behaviors and meeting goals.

5.3 Implications

The present study adds to the limited body of research on staff training in CSPAP programs. Results identify the claim of online communities of practice as a feasible strategy to support staff involvement in school wellness programming. School staff identified the CoP as a valuable tool in supporting school wellness programming, therefore both current and future CSPAP interventions may likely benefit from incorporating an online CoP as a tool for supporting school staff. This study also adds to the body of research on perceptions of online communities of practice in the school setting and obstacles to participating in these communities. The strategies utilized in this study to facilitate trust and support in online communities of practice are also valuable tools for online communities of practice in the school setting.

CSPAPs hold great potential for increasing physical activity and promoting healthy behaviors in children; however, the minimal focus on strategies to support school staff in CSPAP implementation reveals needed areas of improvement. Although CoPs have been found difficult to implement and maintain successfully (Centeio et al,,2014; Probst & Borzillo, 2008), their potential has led them to be proposed as a strategy to expand the structure of support for CSPAPs. When implemented successfully, they are found to be practices that are both scalable and sustainable in the education setting (Castelli, 2013; Webster et al., 2015). Findings from this study support the needs of school staff and show great potential in the success of online communities of practice in CSPAP implementation.

REFERENCES

American Alliance for Health, Physical Education, Recreation and Dance. (2013). Comprehensive School Physical Activity Programs: Helping All Students Achieve 60 Minutes of Physical Activity Each Day. [Position Statement]. Retrieved from https://www.shapeamerica.org/advocacy/positionstatements/pa/upload/Comprehensive-School-Physical-Activity-programs-2013.pdf

B Russ, L., Webster, C., Beets, M., & Phillips, D. (2014). Systematic Review and Meta-Analysis of Multi-Component Interventions Through Schools to Increase Physical Activity. *Journal of Physical Activity and Health*, *12*. https://doi.org/10.1123/jpah.2014-0244

Basch, C. E. (2011). Healthier students are better learners: a missing link in school reforms to close the achievement gap. *The Journal of School Health*, *81*(10), 593–598. https://doi.org/10.1111/j.1746-1561.2011.00632.x

Baumeister, R., & Leary, M. (1995). *The Need to Belong: Desire for Interpersonal Attachments as a Fundamental Human Motivation* (Vol. 117). https://doi.org/10.1037/0033-2909.117.3.497

Beets, M. W., Beighle, A., Erwin, H. E., & Huberty, J. L. (2009). After-School Program Impact on Physical Activity and Fitness: A Meta-Analysis. *American Journal of Preventive Medicine*, *36*(6), 527–537. https://doi.org/10.1016/j.amepre.2009.01.033

Berei, C. P. (2015). *Describing and understanding factors related to implementing comprehensive school physical activity programs by physical education educators.* Unpublished doctoral dissertation, University of Northern Colorado,

Greeley, CO.

Buysse, V., Sparkman, K. L., & Wesley, P. W. (2003). Communities of Practice: Connecting What We Know with What We Do. *Exceptional Children*, *69*(3), 263.

Castelli, D. M., Centeio, E. E., Beighle, A. E., Carson, R. L., & Nicksic, H. M. (2014). Physical literacy and Comprehensive School Physical Activity Programs. *Preventive Medicine*, *66*, 95–100. https://doi.org/10.1016/j.ypmed.2014.06.007

Castelli, D. M., Centeio, E. E., & Nicksic, H. M. (2013). Preparing Educators to Promote and Provide Physical Activity in Schools. *American Journal of Lifestyle Medicine*, *7*(5), 324–332. https://doi.org/10.1177/1559827613490488

Center for Disease Control and Prevention. (2012). Youth Risk Behavior Surveillance – United States, 2011. Atlanta, GA.

Centeio, E.E., Erwin, H., Castelli, D.M. (2014). Comprehensive School Physical Activity Programs: Characteristics of Trained Teachers. *Journal of Teaching in Physical Education, 33*(4), 492-510. doi: 10.1123/jtpe.2014-0066

Chou, S.-W. (2005). Designing good institutional contexts for innovation in a technology-mediated learning environment. *J. Comp. Assisted Learning*, *21*, 269–280. https://doi.org/10.1111/j.1365-2729.2005.00134.x

Egan, C. A., Webster, C., Weaver, R. G., Brian, A., Stodden, D., Russ, L., … Vazou, S. (2018). Partnerships for Active Children in Elementary Schools (PACES): First year process evaluation. *Evaluation and Program Planning*, *67*, 61–69. https://doi.org/10.1016/j.evalprogplan.2017.12.002

Eisenmann, J. C., Gentile, D. A., Welk, G. J., Callahan, R., Strickland, S., Walsh, M., & Walsh, D. A. (2008). SWITCH: rationale, design, and implementation of a

community, school, and family-based intervention to modify behaviors related to childhood obesity. *BMC Public Health*, *8*, 223. https://doi.org/10.1186/1471-2458-8-223

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, *26*(4), 331–362. https://doi.org/10.1002/job.322

Gentile, D. A., Welk, G., Eisenmann, J. C., Reimer, R. A., Walsh, D. A., Russell, D. W., … Fritz, K. (2009). Evaluation of a multiple ecological level child obesity prevention program: Switch® what you Do, View, and Chew. *BMC Medicine*, *7*, 49. https://doi.org/10.1186/1741-7015-7-49

Hagerty, B. M., Lynch-Sauer, J., Patusky, K. L., Bouwsema, M., & Collier, P. (1992). Sense of belonging: A vital mental health concept. Archives of Psychiatric Nursing, 6, 172–177.

Huberty, J., Dinkel, D., Coleman, J., Beighle, A., & Apenteng, B. (2012). The role of schools in children's physical activity participation: staff perceptions. *Health Education Research,* cys071.

Institute of Medicine (2013). *Educating the student body: Taking physical education to school.* Washington, DC: The National Academies Press.

Kankanhalli, A., Tan, B. C. Y., & Wei, K.-K. (2005). Contributing Knowledge to Electronic Knowledge Repositories: An Empirical Investigation. *MIS Quarterly*, *29*(1), 113–143. https://doi.org/10.2307/25148670

Lampe, C., & Ellison, N. (2012). Understanding Facebook: Social Computing Isn't Just Social. *Computer*, *45*(9), 98–100. https://doi.org/10.1109/MC.2012.324

Lander, N., Eather, N., Morgan, P. J., Salmon, J., & Barnett, L. M. (2017).

Characteristics of Teacher Training in School-Based Physical Education Interventions to Improve Fundamental Movement Skills and/or Physical Activity: A Systematic Review. *Sports Medicine*, *47*(1), 135–161. https://doi.org/10.1007/s40279-016-0561-6

Lee-Kelley, L. & Turner, N. (2017). PMO mangers' self-determined participation in a purposeful virtual community-of-practice. *International Journal of Project Management. 35*(2017), 64-77.

Lin, H.-F. (2008). Determinants of successful virtual communities: Contributions from system characteristics and social factors. *Information & Management*, *45*(8), 522–527. https://doi.org/10.1016/j.im.2008.08.002

Loewenberg Ball, D., & Forzani, F. M. (2009). The Work of Teaching and the Challenge for Teacher Education. *Journal of Teacher Education*, *60*(5), 497–511. https://doi.org/10.1177/0022487109348479

Macià, M., & García, I. (2016). Informal online communities and networks as a source of teacher professional development: A review. *Teaching and Teacher Education*, *55*(Supplement C), 291–307. https://doi.org/10.1016/j.tate.2016.01.021

McCaughtry, N., Kulinna, P. H., Cothran, D., Martin, J., & Faust, R. (2005). Chapter 3: Teachers mentoring teachers: A view over time. *Journal of Teaching in Physical Education*, *24*(4), 326-343.

McMillan, D.W., & Chavis, D.M. (1986). Sense of Community: A Definition and Theory. *Journal of Community Psychology, 14,* 6-23.

McMullen, J., Kulinna, P., & Cothran, D. (2014). Chapter 5 Physical Activity Opportunities during the School Day: Classroom Teachers' Perceptions of Using

Activity Breaks in the Classroom. *Journal of Teaching in Physical Education*, *33*(4), 511–527. https://doi.org/10.1123/jtpe.2014-0062

Metcalf, B., Henley, W., Wilkin, T. (2012). Effectiveness of intervention on physical activity of children: systematic review and meta-analysis of controlled trials with objectively measured outcomes (EarlyBird 54). *British Medical Journal, 345*(7876), 16.

Moore, J.A., & Chae, B. (2007). Beginning teachers' use of online resources and communities. *Technology, Pedagogy and Education, 16*(2), 215-224.

Nahapiet, J., & Ghoshal, S. (1998). Social Capital, Intellectual Capital, and the Organizational Advantage. *The Academy of Management Review*, *23*(2), 242–266. https://doi.org/10.2307/259373

National Association for Sport and Physical Education. (2003). What constitutes a quality physical education program? [Position statement] Reston, VA: Author.

National Association for Sport and Physical Education (2008). Comprehensive school physical activity programs [Position statement]. Reston, VA: Author.

National Commission on Teaching and America's Future. (1997). *Doing what matters most: Investing in quality teaching*. New York: Author.

Polly, D., McGee, J., Wang, C., Martin, C., Lambert, R., & Pugalee, D. K. (2015). Linking professional development, teacher outcomes, and student achievement: The case of a learner-centered mathematics program for elementary school teachers. *International Journal of Educational Research*, *72*(Supplement C), 26–37. https://doi.org/10.1016/j.ijer.2015.04.002

Probst, G., & Borzillo, S. (2008). Why communities of practice succeed and why they

fail. *European Management Journal. 26,* 335-347.

Putnam, R., (1995). Bowling Alonge: American's Declining Social Capital. *Journal of Democracy, 6*(1). 65-78.

Rink, J.E., Hall, T.J. & Williams, L.H. (2010). Schoolwide physical activity: A comprehensive guide to designing and conducting programs. Champaign, IL: Human Kinetics.

Roberts, J. (2006). Limits to Communities of Practice. *Journal of Management Studies*, *43*(3), 623–639. https://doi.org/10.1111/j.1467-6486.2006.00618.x

Rousseau, D. M., Sitkin, S. B., Burt, R. S., & Camerer, C. (1998). Introduction to Special Topic Forum: Not so Different after All: A Cross-Discipline View of Trust. *The Academy of Management Review*, *23*(3), 393–404.

Russ, L. B., Webster, C. A., Beets, M. W., & Phillips, D. S. (2015). Systematic Review and Meta-Analysis of Multi-Component Interventions Through Schools to Increase Physical Activity. *Journal of Physical Activity & Health*, *12*(10), 1436–1446. https://doi.org/10.1123/jpah.2014-0244

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78. doi:10.1037/0003-066X.55.1.68

Sallis, J. F., Patterson, T. L., McKenzie, T. L., & Nader, P. R. (1988). Family variables and physical activity in preschool children. *Journal of Developmental and Behavioral Pediatrics: JDBP*, *9*(2), 57–61.

Sánchez, B., Colón, Y., & Esparza, P. (2005). The Role of Sense of School Belonging and Gender in the Academic Adjustment of Latino Adolescents. *Journal of Youth*

and Adolescence, *34*(6), 619–628. https://doi.org/10.1007/s10964-005-8950-4

Schwimmer, J. B., Burwinkle, T. M., & Varni, J. W. (2003). Health-Related Quality of Life of Severely Obese Children and Adolescents. *JAMA*, *289*(14), 1813–1819. https://doi.org/10.1001/jama.289.14.1813

Shampy Kamboj, & Zillur Rahman. (2017). Measuring customer social participation in online travel communities: Scale development and validation. *Journal of Hospitality and Tourism Technology*, *8*(3), 432–464. https://doi.org/10.1108/JHTT-08-2016-0041

Sharpe, E. K., Forrester, S., & Mandigo, J. (2011). Engaging Community Providers to Create More Active After-School Environments: Results from the Ontario CATCH Kids Club Implementation Project. *Journal of Physical Activity & Health*, *8 Suppl 1*, S26-31.

Stylianou, M., Kulinna, P.H., & Naiman, T. (2016). "…because there's nobody who can just sit that long": Teacher perceptions of classroom-based physical activity and related management issues." *European Physical Education Review, 22*(3), 390-408.

Supovitz, J. A., & Turner, H. M. (2000). The effects of professional development on science teaching practices and classroom culture. *Journal of Research in Science Teaching*, *37*(9), 963–980. https://doi.org/10.1002/1098-2736(200011)37:9<963::AID-TEA6>3.0.CO;2-0

Tang, E., & Lam, C. (2014). Building an effective online learning community (OLC) in blog-based teaching portfolios. *The Internet and Higher Education*, *20*(Supplement C), 79–85. https://doi.org/10.1016/j.iheduc.2012.12.002

Telese, J. A. (2012). Middle School Mathematics Teachers' Professional Development and Student Achievement. *Journal of Educational Research*, *105*(2), 102–111. https://doi.org/10.1080/00220671.2010.521209

Teo, H.-H., Chan, H.-C., Wei, K.-K., & Zhang, Z. (2003). Evaluating information accessibility and community adaptivity features for sustaining virtual learning communities. *International Journal of Human-Computer Studies*, *59*(5), 671–697. https://doi.org/10.1016/S1071-5819(03)00087-9

Traci Shizu Kutaka, Wendy M. Smith, Anthony D. Albano, Carolyn Pope Edwards, Lixin Ren, Heidi Lynn Beattie, … Walter W. Stroup. (2017). Connecting Teacher Professional Development and Student Mathematics Achievement: A 4-Year Study of an Elementary Mathematics Specialist Program. *Journal of Teacher Education*, *68*(2), 140–154. https://doi.org/10.1177/0022487116687551

United States Department of Health and Human Services (2008). Physical activity guidelines for Americans. Retrieved June 24, 2012, from www.health.gov/paguidelines.

United States Department of Health and Human Services (2010). The association between school-based physical activity, including physical education, and academic performance. Atlanta: Centers for Disease Control and Prevention.

Vazou, S., Hutchinson, A., & Webster, C. A. (2015, March). Empowering teachers to integrate physical activity: Online communities of practice. Symposium presentation at the SHAPE America

Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education. 24*(1), 80-91.

Weaver, R. G., Beets, M. W., Saunders, R. P., Beighle, A., & Webster, C. (2014). A comprehensive professional development training's effect on afterschool program staff behaviors to promote healthy eating and physical activity. *Journal of Public Health Management and Practice: JPHMP*, *20*(4), E6–E14. https://doi.org/10.1097/PHH.0b013e3182a1fb5d

Weaver, R.G., Moore, J.B., Huberty, J., Freedman, D., Truner-McGrievy, B., Beighle, A., ... Brazendale, K. (2016) Process Evaluation of Making HEPA Policy Practice a Group Randomized Trial. *Health Promotion Practice, 17*(5), 631-647.

Weaver, R.G., Webster, C.A., Egan C., Campos, C.M.C., Michael, R.D., Vazou, S. (2017). Partnerships for Active Children in Elementary Schools: Outcomes of a 2-Year Pilot Study to Increase Physical Activity During the School Day. *American Journal of Health Promotion.* doi:10.1177/0890117117707289

Webster, C.A., Beets, M., Weaver R.G., Vazou, S., Russ, L. Rethinking recommendations for implementing comprehensive school physical activity programs: A partnership model. *Quest, 67*(2). 185-202.

Webster, C.A., Weaver, R.G., Carman, M., Marcheschi, L., Loulousis, A., Vazou, S., Goh, T.L., Carson, R.L., (2018). Chapter 10: Staff Involvement. Unpublished manuscript.

Wenger-Traynor, E., (2014). Communities of Practice: Theories and Current Thinking. UDOL Academic Conference. Retrieved from

https://www.youtube.com/watch?reload=9&v=71xF7HTEipo&t=3956s

Wenger-Trayner, E., & Wenger-Trayner, B. (2015). Communities of practice a brief introduction. Retrieved from http://wenger-trayner.com/wp-content/uploads/2015/04/07-Brief-introduction-to-communities-of-practice.pdf

Williams, J., & Jacobs, J. (2004). Exploring the Use of Blogs as Learning Spaces in the Higher Education Sector. *Australasian Journal of Educational Technology*, *20*. https://doi.org/10.14742/ajet.1361

Winter-Collins, A., & McDaniebel, A. M. (2000). Sense of belonging and new graduate job satisfaction. *Journal for Nurses in Staff Development: JNSD: Official Journal of the National Nursing Staff Development Organization*, *16*(3), 103–111.

Wu, J.-J., & Chang, Y.-S. (2005). Towards understanding members' interactivity, trust, and flow in online travel community. *Industrial Management & Data Systems*, *105*(7), 937–954. https://doi.org/10.1108/02635570510616120

Yoon, K., & Armour, K. M. (2017). Mapping physical education teachers' professional learning and impacts on pupil learning in a community of practice in South Korea. *Physical Education and Sport Pedagogy*, *22*(4), 427–444. https://doi.org/10.1080/17408989.2016.1268589

Zhao, L., Lu, Y., Wang, B., Chau, P. Y. K., & Zhang, L. (2012). Cultivating the sense of belonging and motivating user participation in virtual communities: A social capital perspective. *International Journal of Information Management*, *32*(6), 574–588. https://doi.org/10.1016/j.ijinfomgt.2012.02.006

APPENDIX A: ADDITIONAL ACTIVITY RESULTS

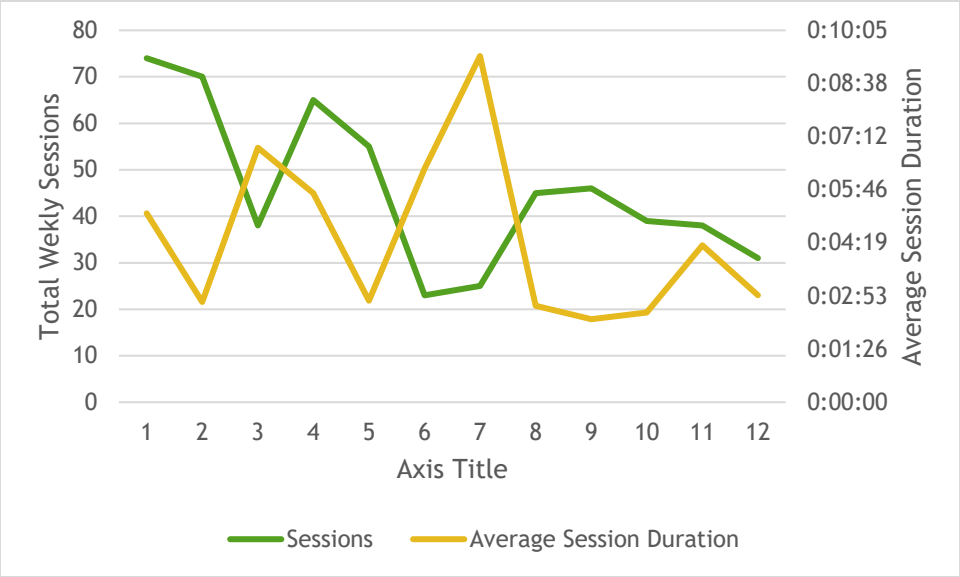

Figure 11: Average Session Duration and Total Weekly Sessions

APPENDIX B: PERCEIVED VALUE & BARRIERS SURVEY QUESTIONS

Factors
Value & Interest
V1. I received valuable ideas and resources about SWITCH from the SWITCH ning community
V2. I believe the SWITCH ning Community was of great value to the SWITCH program
V3. I would describe the SWITCH ning Community as interesting
V4. I enjoyed participating in the SWITCH ning Community
Support
S1. I felt the SWITCH ning Community provided me with choices and options
S2. I felt listened to on how I would like to do things by the SWITCH ning Community
S3. The SWITCH research team encouraged me to ask questions in the SWITCH ning community
S4. The SWITCH ning Community conveyed confidence in my ability to implement SWITCH at my school
S5. I felt understood by the SWITCH team and the other members of the SWITCH ning Community
Belonging
Sense of belonging
B1. I felt a sense of belonging to the SWITCH ning Community
B2. I felt I am a member of the SWITCH ning Community
Trust
B3. the members of the SWITCH ning Community were trustworthy
B4. The SWITCH team and community members did their best to help others
Familiarity
B5. I became familiar with what other schools do related to SWITCH through reading and posting
B6. I became familiar with the SWITCH resources through reading posts
Similarity
B7. I felt the members of the SWITCH ning Community have values similar to mine
B8. I felt the members of the SWITCH ning Community have interest similar to mine

Obstacles
Ob 1. I was not sure about the purpose
Ob 2. I was not informed or reminded frequently to visit
Ob 3. It was hard to find information (the platform was not user friendly)
Ob 4. Visiting and posting required a lot of extra effort
Ob 5. I didn’t feel confident in sharing content
Ob 6. I worried that my posts might not be perceived as interesting
Ob 7. I didn’t feel I had anything to share or commend
Ob 8. I don’t like communicating with others through digital technology
Ob 9. I don’t have easy access to internet
Ob 10. I didn’t have extra time to search for information online
Ob 11. It was hard to visit as it was not embedded with the SWITCH tracking website
Ob 12. The content wasn’t important (I had the information I needed)
Ob 13. The content that was shared was not of interest to me
Ob 14. My colleagues didn’t participate, so I didn’t either

APPENDIX C

IRB APPROVAL MEMO

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294-4566

Date: 612712017

To: Dr. Lorraine Lanningham-Foster
220 MacKay Hall

From: Office for Responsible Research

Title: Dissemination of the SWTCH Program

IRB ID:

Approval Date: 612712017 Date for Continuing Review: 718/2018

Submission Type: Continuing Review Review Type: Expedited

The project referenced above has received approval from the Intuitional Review Board (IRB) at Iowa State University according to the dates shown above. Please refer to the IRB ID number shown above in all correspondence regarding this study.

To ensure compliance with federal regulations (45 CFR 46 & 21 CFR 56), please be sure to:

- Use only the approved study materials in your research, including the recruitment materials and informed consent documents that have the IRB approval stamp.
- Retain signed Informed consent documents for 3 years after the close of the study, when documented consent is required.
- Obtain IRB approval prior to implementing any changes to the study by submitting a Modification Form for Non-Exempt Research or Amendment for Personnel Changes form, as necessary.
- Immediately inform the IRB of (1) all serious and/or unexpected adverse experiences involving risks to subjects or others; and (2) any other unanticipated problems involving risks to subjects or others.
- Stop all research activity if IRB approval lapses, unless continuation is necessary to prevent harm to research participants. Research activity can resume once IRB approval is reestablished.

- Complete a new continuing review form at least three to four weeks prior to the date for continuing review as noted above to provide sufficient time for the IRB to review and approve continuation of the study. We will send a courtesy reminder as this date approaches.

Please be aware that IRB approval means that you have met the requirements of federal regulations and ISU policies governing human subjects research. Approval from other entities may also be needed. For example, access b data from private records (e.g. student, medical, or employment records, etc.) that are protected by FERPA, HIPAA. or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. IRB approval in no way implies or guarantees that permission from these other entities will be granted.

Upon completion of the project, please submit a Project Closure Form to the Office for Responsible Research, 202 Kingland, to officially close the project.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

INSTITUTIONAL REVIEW BOARD (IRB)
Continuing Review Form

Principal Investigator (PI): Lorraine Lanningham-Foster/Greg Welk			Degrees: PhD
University ID: 786339554 (LLF)	Phone: 4-4684	Email Address: lmlf@iastate.edu	
Department: FSHN/KIN			
FOR STUDENT PROJECTS (Required when the principal investigator is a student)			
Name of Major Professor/Supervising Faculty:			
University ID:	Phone:	Email Address: @iastate.edu	
Alternate Contact Person:		Email Address:	
Correspondence Address:		Phone:	

Title of Project: Dissemination of the SWITCH Program

Please notify the IRB Office if your contact information has changed since the last review.

IRB
JUN 16 2017

ASSURANCE

- I certify that the information provided in this application is complete and accurate and consistent with any proposal(s) submitted to external funding agencies. Misrepresentation of the research described in this or any other IRB application may constitute noncompliance with federal regulations and/or academic misconduct.
- I agree to provide proper surveillance of this project to ensure that the rights and welfare of the human subjects are protected. I will report any problems to the IRB. See Reporting Adverse Events and Unanticipated Problems for details.
- I agree that modifications to the approved project will not take place without prior review and approval by the IRB.

- I agree that the research will not take place without the receipt of permission from any cooperating institutions when applicable. • I agree to obtain approval from other appropriate committees as needed for this project, such as the IACUC (if the research includes animals), the IBC (if the research involves biohazards), the Radiation Safety Committee (if the research involves x-rays or other radiation producing devices or procedures), etc., and to obtain background checks for staff when necessary.
- I understand that IRB approval of this project does not grant access to any facilities, materials, or data on which this research may depend. Such access must be granted by the unit with the relevant custodial authority.
- I agree that all activities will be performed in accordance with all applicable federal, state, local, and Iowa State University policies.

Signature of Principal Investigator Date Signature of Major Professor/Supervising Faculty Date
(Required when the principal investigator is a student)

For IRB Use Only	Full Committee Review:			Review Date:	
	EXPEDITED per 45 CFR 46.110(b): I Category Letter			Approval/Determination Date: - Z 7 — 1 7	
				Approval Expiration Date	1-3- 16
	OTHER:			Risk: Minimal	More than Minimal
IRB Reviewer's Si nature					

ACKNOWLEDGEMENTS

I would first like to thank my major professor, Dr. Spyridoula Vazou. Her support and guidance have been great assets in the completion of this thesis. Her enthusiasm and passion for this project have encouraged me and made working on this project very enjoyable. I have been truly blessed to have been able to work closely with Dr. Vazou. I would also like to thank Dr. Greg Welk and Dr. Lorraine Lanningham-Foster for sitting on my committee. Dr. Welk and Dr. Lanningham-Foster have worked extremely hard on making SWITCH into something truly great, and all have added considerably to the completion of this thesis.

I would also like to thank those who have spent so much time and effort on SWITCH and assisted me with this project. Joey Lee was an incredible help in contributing data and providing input to enhance our efforts. Laura Liechty was also an incredible help in communicating with school staff about the CoP and for all of her hard work in SWITCH overall. I would like to thank both Laura and Joey for contributing their engagement on the CoP as part of the SWITCH Team.

Lastly, I would like to thank my family and friends who have been incredible support systems throughout my time working on this project. They offered encouragement throughout the stressful days and long nights and always provided a much-needed listening ear. I couldn't have done it without each and every one of them.